APPENDIX B

LABORATORY TESTING

Appendix B-1 Moisture Content, Particle-size Analyses, and Atterberg Limits
Appendix B-II Standard Proctor Testing
Appendix B-III Thermal Resistivity Testing
Appendix B-IV Corrosion Testing

APPENDIX B-I

Moisture Content, Particle-size Analysis, and Atterberg Limits

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-1	0.0				21.2					-	-	-
B19-1	2.0	50	15	35	17.8	87	50	CH	Fat Clay	-	-	-
B19-1	4.0				24.5					-	-	-
B19-1	8.5	32	17	15	17.6					-	-	-
B19-1	18.5				10.0					-	-	-
B19-1	23.5				8.5					-	-	-
B19-1	28.5				10.6					-	-	-
B19-1	33.5				8.2					-	-	-
B19-1	38.5				7.9					-	-	-
B19-2	0.0				23.8					-	-	-
B19-2	2.0				25.1					-	-	-
B19-2	4.0				25.7					-	-	-
B19-2	8.5				35.4					-	-	-
B19-3	0.0				14.1					-	-	-
B19-3	1.0				24.2					107.3	18.9	-
B19-3	2.0				26.3					-	-	-
B19-3	4.0				23.3					-	-	-
B19-3	8.5				11.4					-	-	-
B19-3	13.5				14.4					-	-	-
B19-3	18.5				11.9					-	-	-
B19-3	23.5				11.0					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-4	0.0				19.3					-	-	-
B19-4	2.0	61	18	43	30.7	90	58	CH	Fat Clay	-	-	-
B19-4	4.0				25.9					-	-	-
B19-4	8.5	38	23	15	21.9					-	-	-
B19-4	13.5				12.1					-	-	-
B19-4	18.5				14.5					-	-	-
B19-5	0.0				8.3					-	-	-
B19-5	1.0				26.1					104.1	21.0	4.8
B19-5	2.0				10.3					-	-	-
B19-5	4.0				23.5					-	-	-
B19-5	8.5				12.0					-	-	-
B19-5	13.5				7.8					-	-	-
B19-6	0.0				22.7					-	-	-
B19-6	2.0	55	18	37	29.5	93	55	CH	Fat Clay	-	-	-
B19-6	4.0				23.6					-	-	-
B19-6	8.5	28	15	13	10.2					-	-	-
B19-6	13.5				16.4					-	-	-
B19-6	18.5				15.3					-	-	-
B19-7	0.0				20.7					-	-	-
B19-7	2.0	45	16	29	22.9	86	47	CL	Lean Clay	-	-	-
B19-7	4.0	54	16	38	27.2					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-7	8.5				7.5					-	-	-
B19-7	13.5				9.4					-	-	-
B19-7	18.5				7.1					-	-	-
B19-8	0.0				19.1					-	-	-
B19-8	2.0	49	16	33	22.1					-	-	-
B19-8	4.0				22.8					-	-	-
B19-8	8.5	19	13	6	7.7					-	-	-
B19-8	13.5				9.4					-	-	-
B19-8	18.5				15.6					-	-	-
B19-9	0.0				22.6					-	-	-
B19-9	2.0				28.0					-	-	-
B19-9	4.0				21.9					-	-	-
B19-9	8.5				19.0					-	-	-
B19-9	13.5				12.9					-	-	-
B19-9	18.5				10.0					-	-	-
B19-10	0.0				21.1					-	-	-
B19-10	2.0	53	17	36	26.5	90	52	CH	Fat Clay	-	-	-
B19-10	4.0				27.7					-	-	-
B19-10	8.5	22	14	8	7.5					-	-	-
B19-10	13.5				8.7					-	-	-
B19-10	18.5				7.4					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-11	0.0				8.3					-	-	-
B19-11	2.0				20.4					-	-	-
B19-11	4.0				11.2					-	-	-
B19-11	8.5				10.5					-	-	-
B19-11	13.5				12.4					-	-	-
B19-11	18.5				10.1					-	-	-
B19-12	0.0				21.0					-	-	-
B19-12	2.0				30.6					-	-	-
B19-12	4.0				25.0					-	-	-
B19-12	8.5				19.6					-	-	-
B19-12	13.5				10.0					-	-	-
B19-12	18.5				9.8					-	-	-
B19-13	0.0				19.1					-	-	-
B19-13	2.0	46	16	30	18.4					-	-	-
B19-13	4.0				20.5					-	-	-
B19-13	8.5	24	14	10	15.8					-	-	-
B19-13	13.5				7.7					-	-	-
B19-13	18.5				11.2					-	-	-
B19-14	0.0				26.0					-	-	-
B19-14	2.0	40	15	25	23.1					-	-	-
B19-14	4.0				19.7					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-14	8.5	29	15	14	22.5					-	-	-
B19-14	13.5				9.0					-	-	-
B19-14	18.5				11.7					-	-	-
B19-15	0.0				22.0					-	-	-
B19-15	2.0				24.9					-	-	-
B19-15	4.0				24.5					-	-	-
B19-15	8.5				9.6					-	-	-
B19-15	13.5				12.7					-	-	-
B19-15	18.5				10.1					-	-	-
B19-16	0.0				26.7					-	-	-
B19-16	2.0	54	13	41	18.7					-	-	-
B19-16	4.0				20.5					-	-	-
B19-16	8.5	24	14	10	11.1					-	-	-
B19-16	13.5				8.5					-	-	-
B19-16	18.5				8.6					-	-	-
B19-17	0.0				6.3					-	-	-
B19-17	2.0				24.5					-	-	-
B19-17	4.0				25.6					-	-	-
B19-17	8.5				14.7					-	-	-
B19-17	13.5				10.0					-	-	-
B19-17	18.5				10.5					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-17	23.5				8.9					-	-	-
B19-18	0.0				20.6					-	-	-
B19-18	2.0	56	18	38	27.6	89	55	CH	Fat Clay	-	-	-
B19-18	4.0				23.6					-	-	-
B19-18	8.5	23	14	9	7.7					-	-	-
B19-18	13.5				7.7					-	-	-
B19-18	18.5				9.2					-	-	-
B19-19	0.0				18.2					-	-	-
B19-19	2.0				19.4					-	-	-
B19-19	4.0				17.9					-	-	-
B19-19	8.5				15.4					-	-	-
B19-19	13.5				10.2					-	-	-
B19-19	18.5				8.1					-	-	-
B19-20	0.0				15.2					-	-	-
B19-20	2.0	41	15	26	21.5	85	42	CL	Lean Clay With Sand	-	-	-
B19-20	4.0				23.7					-	-	-
B19-20	8.5	22	13	9	7.2					-	-	-
B19-20	13.5				8.7					-	-	-
B19-20	18.5				9.8					-	-	-
B19-21	0.0				21.4					-	-	-
B19-21	2.0	61	17	44	25.8	93	55	CH	Fat Clay	-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-21	4.0				23.9					-	-	-
B19-21	8.5	46	14	32	22.7					-	-	-
B19-21	13.5				7.1					-	-	-
B19-21	18.5				10.1					-	-	-
B19-22	0.0				12.5					-	-	-
B19-22	2.0	49	15	34	23.5					-	-	-
B19-22	4.0				18.2					-	-	-
B19-22	8.5	29	15	14	15.8					-	-	-
B19-22	13.5				5.9					-	-	-
B19-22	18.5				7.3					-	-	-
B19-22	23.5				10.7					-	-	-
B19-23	0.0				19.5					-	-	-
B19-23	2.0				22.2					-	-	-
B19-23	4.0				19.9					-	-	-
B19-23	8.5				10.6					-	-	-
B19-23	13.5				7.4					-	-	-
B19-23	18.5				10.6					-	-	-
B19-24	0.0				19.9					-	-	-
B19-24	2.0				27.0					-	-	-
B19-24	4.0				32.0					-	-	-
B19-24	8.5				12.4					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-24	13.5				9.9					-	-	-
B19-25	0.0				18.3					-	-	-
B19-25	2.0				21.4					-	-	-
B19-25	4.0				22.3					-	-	-
B19-25	8.5				12.8					-	-	-
B19-25	13.5				7.5					-	-	-
B19-25	18.5				6.9					-	-	-
B19-26	0.0	36	21	15	18.3					-	-	-
B19-26	2.0	51	18	33	28.4					-	-	-
B19-26	4.0	57	18	39	11.8					-	-	-
B19-26	8.5				22.4					-	-	-
B19-26	13.5				8.6					-	-	-
B19-27	0.0				21.8					-	-	-
B19-27	2.0				23.2					-	-	-
B19-27	4.0				27.2					-	-	-
B19-27	8.5				19.9					-	-	-
B19-27	13.5				7.7					-	-	-
B19-27	18.5				6.1					-	-	-
B19-28	0.0				17.1					-	-	-
B19-28	2.0	41	16	25	23.1					-	-	-
B19-28	4.0				21.7					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-28	8.5				10.0					-	-	-
B19-28	13.5				12.2					-	-	-
B19-28	18.5				9.4					-	-	-
B19-29	2.0	58	17	41	25.0					-	-	-
B19-29	4.0				23.1					-	-	-
B19-29	8.5	28	15	13	19.1					-	-	-
B19-29	13.5				14.1					-	-	-
B19-29	18.5				10.6					-	-	-
B19-30	0.0				18.5					-	-	-
B19-30	2.0	51	14	37	23.9	87	50	CH	Fat Clay	-	-	-
B19-30	4.0				24.4					-	-	-
B19-30	8.5	22	12	10	20.3					-	-	-
B19-30	13.5				10.7					-	-	-
B19-30	18.5				6.6					-	-	-
B19-31	0.0				18.4					-	-	-
B19-31	2.0				23.8					-	-	-
B19-31	4.0				24.9					-	-	-
B19-31	8.5				20.7					-	-	-
B19-31	13.5				8.5					-	-	-
B19-31	18.5				10.4					-	-	-
B19-32	0.0				16.0					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-32	2.0				20.3					-	-	-
B19-32	4.0				16.5					-	-	-
B19-32	8.5				8.9					-	-	-
B19-32	13.5				8.6					-	-	-
B19-32	18.5				7.7					-	-	-
B19-33	0.0				18.9					-	-	-
B19-33	2.0	57	17	40	26.7					-	-	-
B19-33	4.0				25.9					-	-	-
B19-33	8.5				16.0					-	-	-
B19-33	13.5				7.7					-	-	-
B19-33	18.5				8.6					-	-	-
B19-34	0.0				23.1					-	-	-
B19-34	2.0	62	16	46	27.1					-	-	-
B19-34	4.0				28.6					-	-	-
B19-34	8.5	39	16	23	25.8					-	-	-
B19-34	13.5				14.0					-	-	-
B19-34	18.5				9.0					-	-	-
B19-35	0.0				25.6					-	-	-
B19-35	2.0				24.9					-	-	-
B19-35	4.0				27.0					-	-	-
B19-35	13.5				10.5					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-35	18.5				9.1					-	-	-
B19-36	0.0				19.3					-	-	-
B19-36	2.0				27.2					-	-	-
B19-36	4.0				21.8					-	-	-
B19-36	8.5				12.0					-	-	-
B19-36	13.5				7.6					-	-	-
B19-36	18.5				8.7					-	-	-
B19-37	0.0				15.7					-	-	-
B19-37	2.0				20.5					-	-	-
B19-37	4.0				18.7					-	-	-
B19-37	8.5				6.1					-	-	-
B19-37	13.5				7.0					-	-	-
B19-37	18.5				6.7					-	-	-
B19-38	0.0				19.4					-	-	-
B19-38	2.0	43	15	28	21.8	87	45	CL	Lean Clay	-	-	-
B19-38	4.0				20.3					-	-	-
B19-38	8.5	24	14	10	7.1					-	-	-
B19-38	13.5				7.1					-	-	-
B19-38	18.5				7.2					-	-	-
B19-39	0.0				19.6					-	-	-
B19-39	2.0				23.5					-	-	-

Summary of Laboratory Results

Hillcrest Solar
Brown County, OH
GCI Job Number: 19-G-23125

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Water Content (%)	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	ASTM Class-ification	USCS Description	Dry Density (pcf)	Optimum Moisture (%)	C.B.R.
B19-39	4.0				22.6					-	-	-
B19-39	8.5				10.6					-	-	-
B19-39	13.5				9.1					-	-	-
B19-39	18.5				9.0					-	-	-
B19-40	0.0				16.6					-	-	-
B19-40	2.0				24.4					-	-	-
B19-40	4.0				19.4					-	-	-
B19-40	8.5				8.7					-	-	-
B19-40	13.5				10.2					-	-	-
B19-40	18.5				12.4					-	-	-

October 2019

Summary of Laboratory Results

Hillcrest Solar Project
Green Township, Brown County, Ohio
GCI Job Number: 18-G-21743

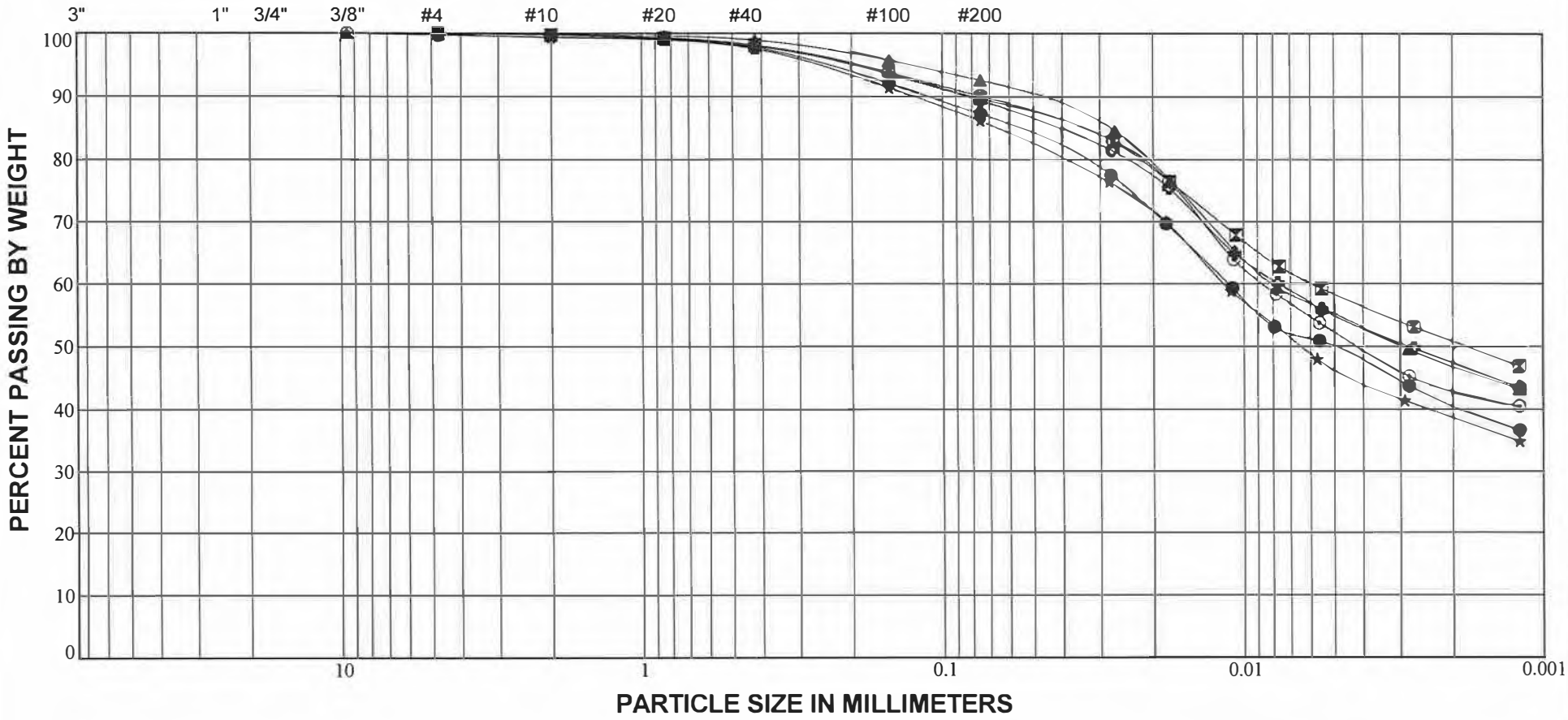
Test Hole	Depth	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	Dry Density (pcf)	Optimum Moisture (%)	ASTM Class-ification	ASTM Description
B18-1	0.0	20.2						-	-		
B18-1	2.0	29.0						-	-		
B18-3A	0.0	24.8						-	-		
B18-3A	2.0	25.1	57	16	41	90.5	56	-	-	CH	Fat Clay
B18-5	0.0	21.8	41	17	24			-	-		
B18-5	8.5	18.0	NP	NP	NP	70.4	15	-	-	ML	Silt With Sand
B18-7	0.0	22.3						-	-		
B18-7	2.0	25.5	59	20	39			-	-		
B18-9	0.0	19.5						-	-		
B18-9	2.0	24.7	50	16	34			-	-		
B18-11	0.0	21.0						-	-		
B18-12	0.0	22.9						-	-		
B18-12	2.0	24.4						-	-		
B18-15	0.0	20.2						-	-		
B18-15	2.0	31.0						-	-		
B18-18	0.0	27.7	41	23	18			-	-		
B18-18	2.0	25.7						-	-		
B18-19	0.0	25.6						-	-		
B18-19	8.5	19.2	NP	NP	NP	41.0	12	-	-	SM	Silty Sand
B18-21	0.0	20.9	35	21	14	83.5	30	-	-	CL	Lean Clay With Sand
B18-23A	0.0	23.2						-	-		
B18-25	0.0	21.3	31	19	12	77.4	29	-	-	CL	Lean Clay With Sand
B18-26	0.0	17.0						-	-		

July 2018

Summary of Laboratory Results

Hillcrest Solar Project
Green Township, Brown County, Ohio
GCI Job Number: 18-G-21743

Test Hole	Depth	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Fines (< #200 Sieve)	% Clay (< 0.005 mm)	Dry Density (pcf)	Optimum Moisture (%)	ASTM Class-ification	ASTM Description
B18-28	0.0	23.8						-	-		
B18-28	13.5	7.6	26	15	11	66.7	32	-	-	CL	Sandy Lean Clay
B18-29	0.0	22.8	33	18	15			-	-		
B18-30	0.0	21.3						-	-		
B18-31	0.0	16.7	31	22	9	80.7	25	-	-	CL	Lean Clay With Sand
B18-32	8.5	16.0	46	18	28	80.5	50	-	-	CL	Lean Clay With Sand
B18-33	0.0	21.1	31	20	11			-	-		
B18-34	0.0	24.2						102.7	20.7		
B18-36	0.0	22.5	50	20	30			-	-		
B18-37	8.5	21.5	23	18	5			-	-		



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

LEGEND:

	TEST HOLE	DEPTH	LL	w_n	PL	USCS SYMBOL	USCS SOIL DESCRIPTION	C.B.R.
●	B19-1	2.0	50	17.8	15	CH	Fat Clay	-
⊠	B19-4	2.0	61	30.7	18	CH	Fat Clay	-
▲	B19-6	2.0	55	29.5	18	CH	Fat Clay	-
★	B19-7	2.0	45	22.9	16	CL	Lean Clay	-
⊙	B19-10	2.0	53	26.5	17	CH	Fat Clay	-
✿	B19-18	2.0	56	27.6	18	CH	Fat Clay	-

Job No.: *19-G-23125*

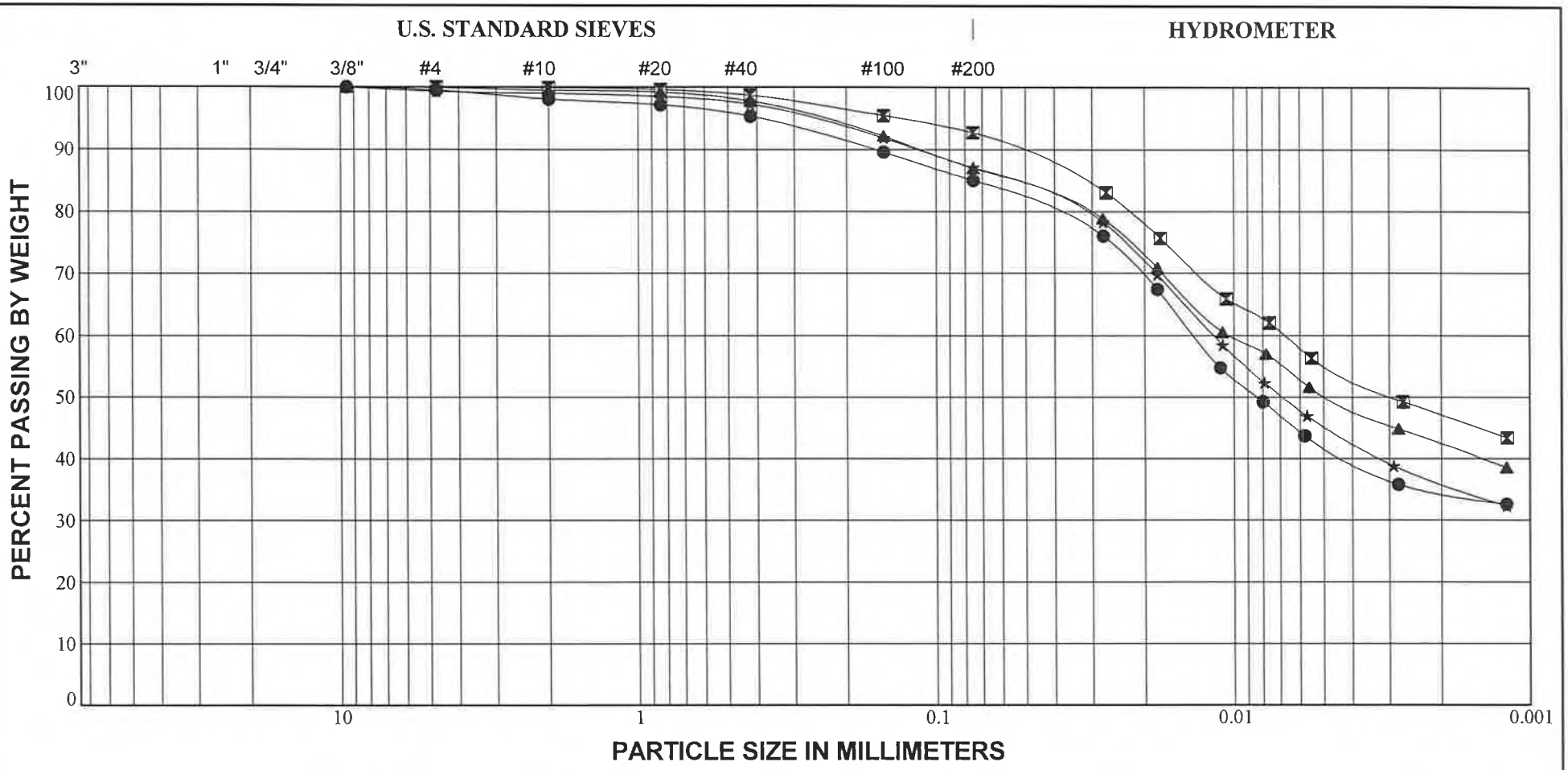
Method: *ASTM D421 D422*

Date: *October 2019*

COMBINED PARTICLE SIZE DISTRIBUTION

Hillcrest Solar - Brown County, OH

Geotechnical Consultants, Inc. - Westerville, Ohio 43081



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

LEGEND:

	TEST HOLE	DEPTH	LL	w_n	PL	USCS SYMBOL	USCS SOIL DESCRIPTION	C.B.R.
●	B19-20	2.0	41	21.5	15	CL	Lean Clay With Sand	-
⊠	B19-21	2.0	61	25.8	17	CH	Fat Clay	-
▲	B19-30	2.0	51	23.9	14	CH	Fat Clay	-
★	B19-38	2.0	43	21.8	15	CL	Lean Clay	-

Job No.: *19-G-23125*

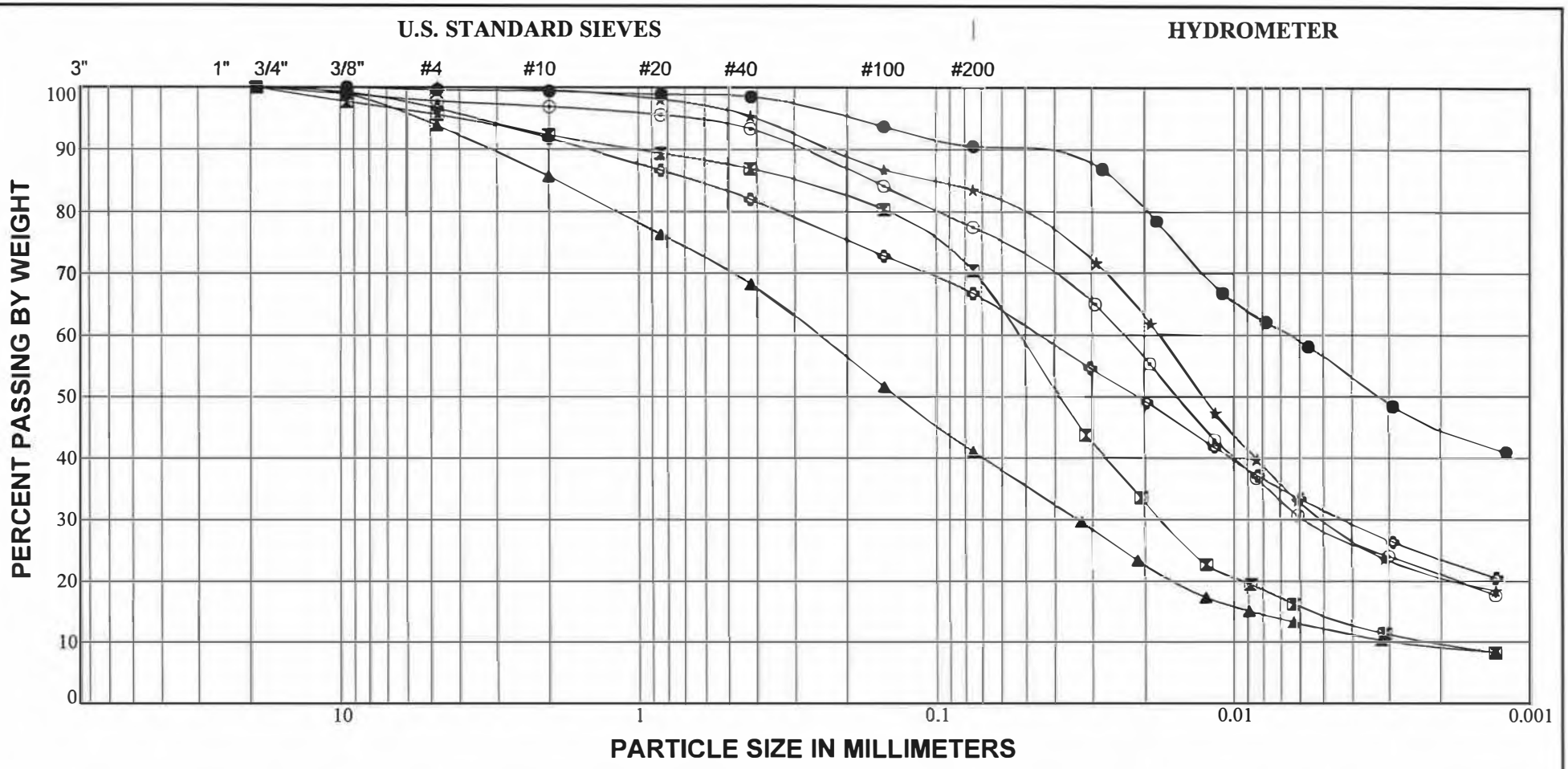
Method: *ASTM D421 D422*

Date: *October 2019*

COMBINED PARTICLE SIZE DISTRIBUTION

Hillcrest Solar - Brown County, OH

Geotechnical Consultants, Inc. - Westerville, Ohio 43081



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

LEGEND:

	TEST HOLE	DEPTH	LL	w_n	PL	ASTM CLASSIFI-CATION	ASTM SOIL DESCRIPTION
●	B18-3A	2.0	57	25.1	16	CH	Fat Clay
⊠	B18-5	8.5	NP	18.0	NP	ML	Silt With Sand
▲	B18-19	8.5	NP	19.2	NP	SM	Silty Sand
★	B-18-21	0.0	35	20.9	21	CL	Lean Clay With Sand
⊙	B-18-25	0.0	31	21.3	19	CL	Lean Clay With Sand
✿	B-18-28	13.5	26	7.6	15	CL	Sandy Lean Clay

Job No.: *18-G-21743*

Method: *ASTM D421 D422*

Date: *July 2018*

COMBINED PARTICLE SIZE DISTRIBUTION

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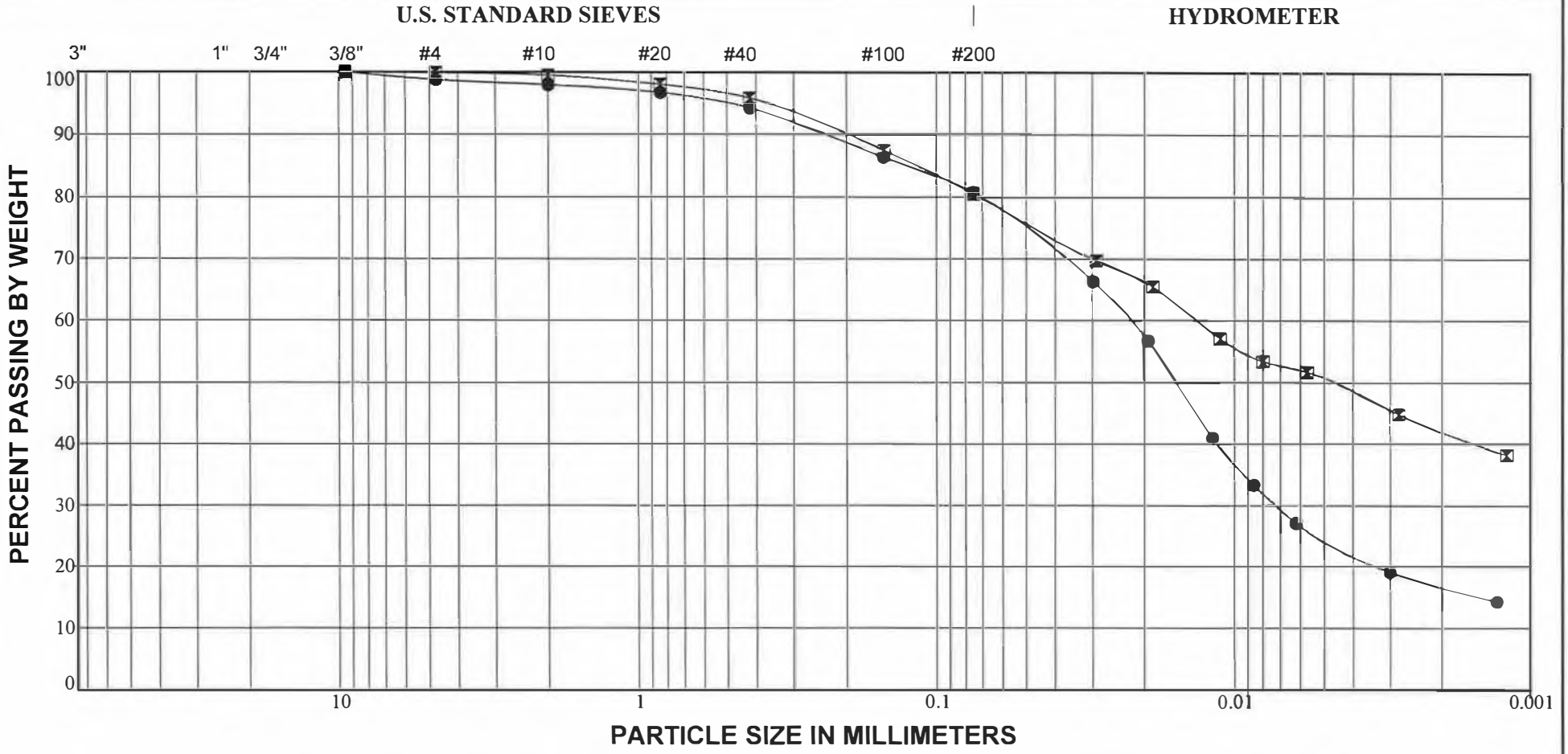
Geotechnical Consultants, Inc. - Westerville, Ohio 43081



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

LEGEND:

	TEST HOLE	DEPTH	LL	w_n	PL	ASTM CLASSIFICATION	ASTM SOIL DESCRIPTION
●	B18-31	0.0	31	16.7	22	CL	Lean Clay With Sand
⊠	B18-32	8.5	46	16.0	18	CL	Lean Clay With Sand

Job No.: *18-G-21743*

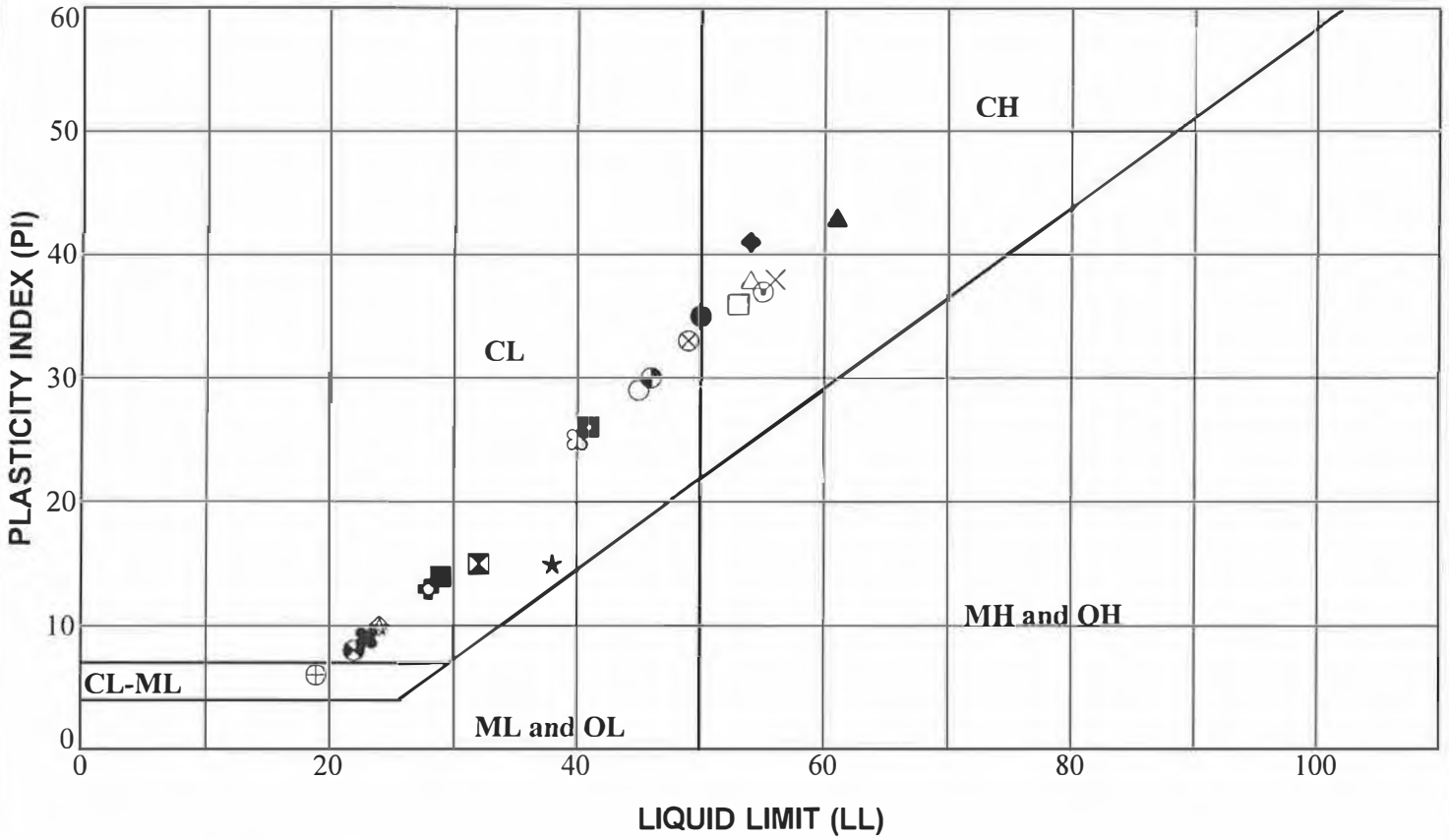
Method: *ASTM D421 D422*

Date: *July 2018*

COMBINED PARTICLE SIZE DISTRIBUTION

Hillcrest Solar Project - Green Township, Brown County, Ohio

Geotechnical Consultants, Inc. - Westerville, Ohio 43081



LEGEND:

	TEST HOLE	DEPTH	w_n	LL	PL	PI	USCS SYMBOL
●	B19-1	2.0	17.8	50	15	35	CH
⊠	B19-1	8.5	17.6	32	17	15	
▲	B19-4	2.0	30.7	61	18	43	CH
★	B19-04	8.5	21.9	38	23	15	
⊙	B19-6	2.0	29.5	55	18	37	CH
✿	B19-6	8.5	10.2	28	15	13	
○	B19-7	2.0	22.9	45	16	29	CL
△	B19-7	4.0	27.2	54	16	38	
⊗	B19-8	2.0	22.1	49	16	33	
⊕	B19-8	8.5	7.7	19	13	6	
□	B19-10	2.0	26.5	53	17	36	CH
⊠	B19-10	8.5	7.5	22	14	8	
◔	B19-13	2.0	18.4	46	16	30	
☆	B19-13	8.5	15.8	24	14	10	
⊠	B19-14	2.0	23.1	40	15	25	
■	B19-14	8.5	22.5	29	15	14	
◆	B19-16	2.0	18.7	54	13	41	
◇	B19-16	8.5	11.1	24	14	10	
×	B19-18	2.0	27.6	56	18	38	CH
✖	B19-18	8.5	7.7	23	14	9	
⊡	B19-20	2.0	21.5	41	15	26	CL

Job No: *19-G-23125*

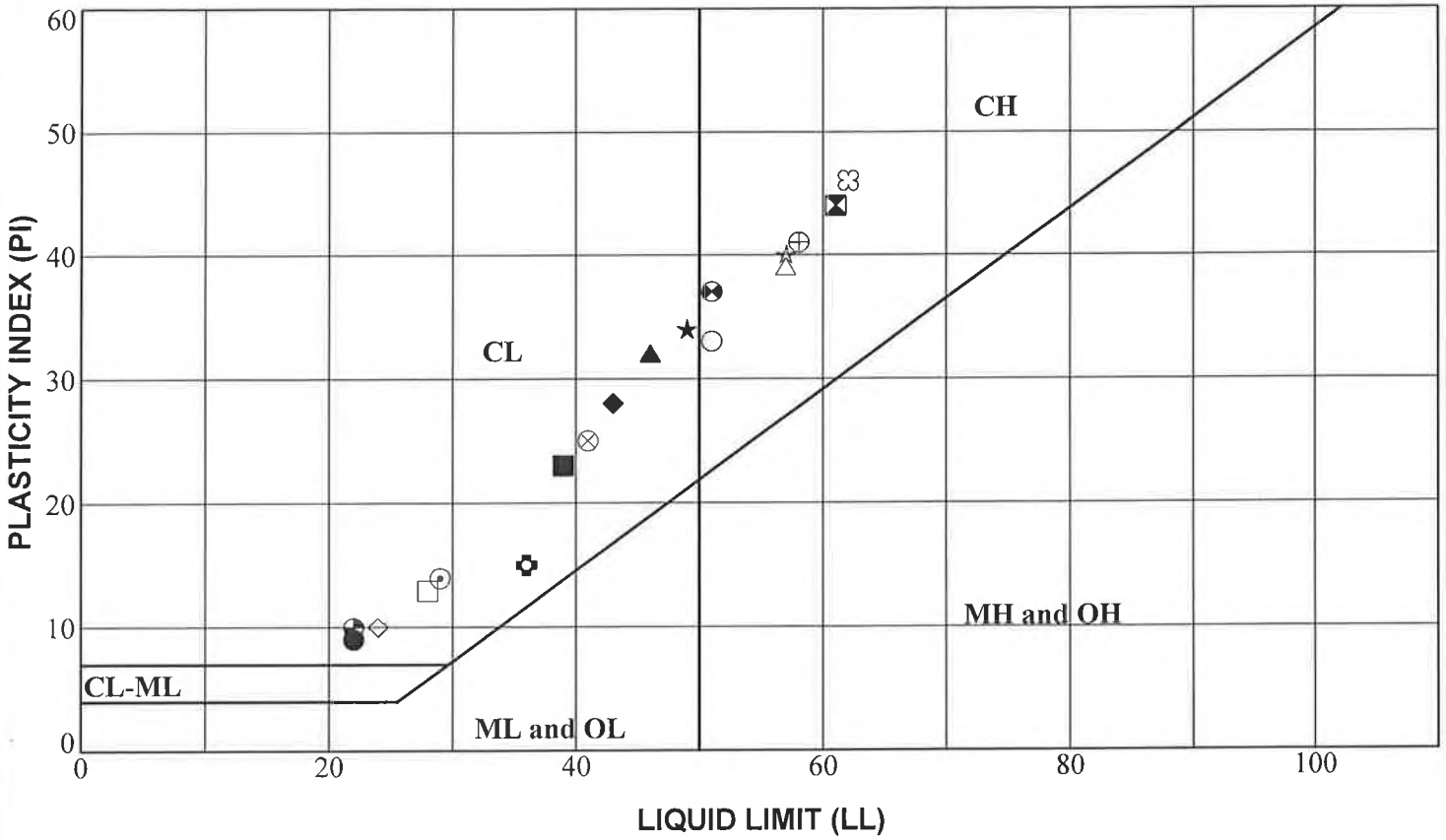
Method: *ASTM D4318*

Date: *October 2019*

ATTERBERG LIMITS TEST RESULTS

Hillcrest Solar
Brown County, OH

Geotechnical Consultants, Inc. - Westerville, Ohio 43081



LEGEND:

	TEST HOLE	DEPTH	w_n	LL	PL	PI	USCS SYMBOL
●	B19-20	8.5	7.2	22	13	9	
⊠	B19-21	2.0	25.8	61	17	44	CH
▲	B19-21	8.5	22.7	46	14	32	
★	B19-22	2.0	23.5	49	15	34	
⊙	B19-22	8.5	15.8	29	15	14	
✿	B19-26	0.0	18.3	36	21	15	
○	B19-26	2.0	28.4	51	18	33	
△	B19-26	4.0	11.8	57	18	39	
⊗	B19-28	2.0	23.1	41	16	25	
⊕	B19-29	2.0	25.0	58	17	41	
□	B19-29	8.5	19.1	28	15	13	
⊛	B19-30	2.0	23.9	51	14	37	CH
◔	B19-30	8.5	20.3	22	12	10	
☆	B19-33	2.0	26.7	57	17	40	
⊠	B19-34	2.0	27.1	62	16	46	
■	B19-34	8.5	25.8	39	16	23	
◆	B19-38	2.0	21.8	43	15	28	CL
◇	B19-38	8.5	7.1	24	14	10	

Job No: *19-G-23125*

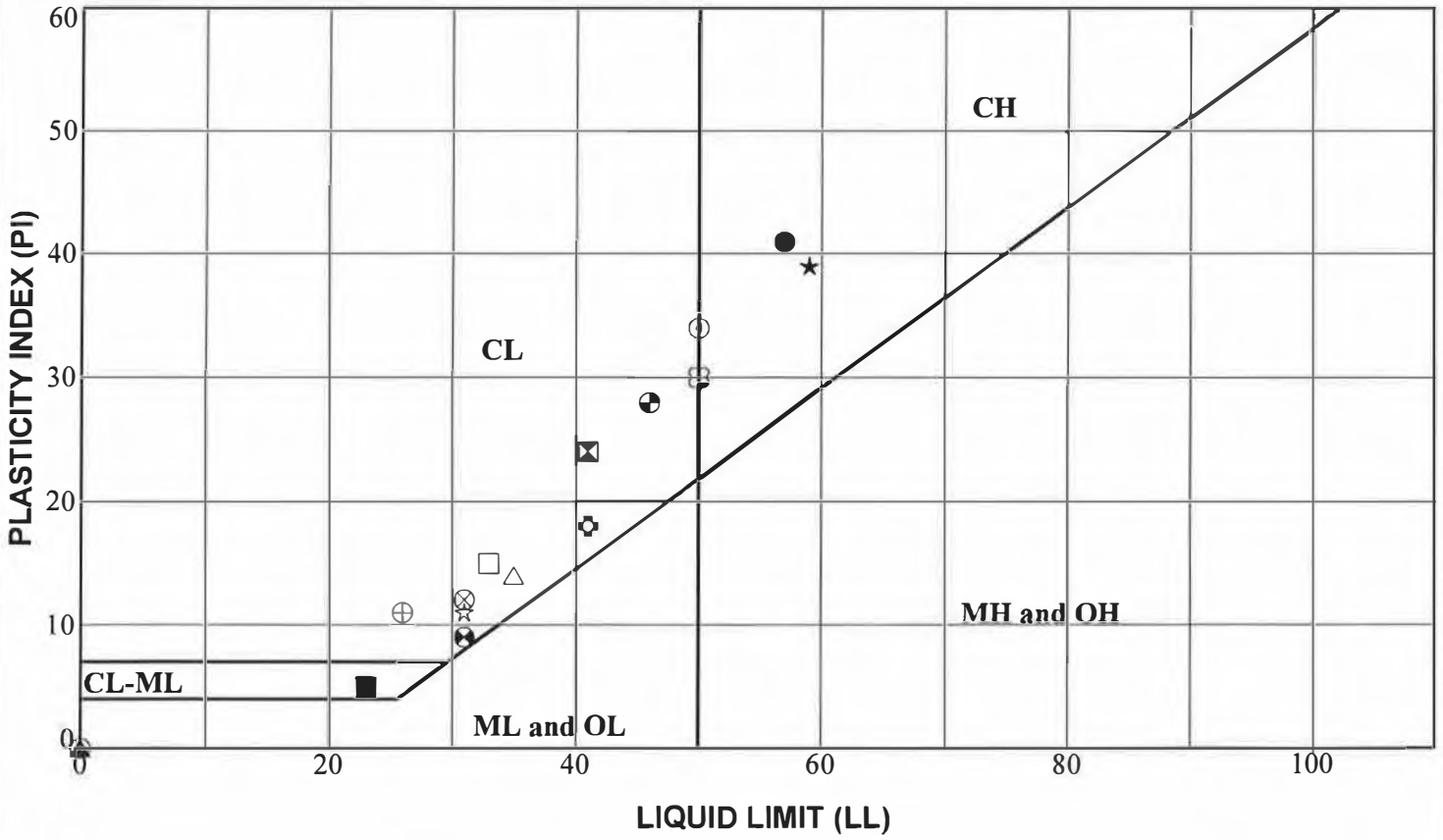
Method: *ASTM D4318*

Date: *October 2019*

ATTERBERG LIMITS TEST RESULTS

Hillcrest Solar
Brown County, OH

Geotechnical Consultants, Inc. - Westerville, Ohio 43081



LEGEND:

	TEST HOLE	DEPTH	w_n	LL	PL	PI	ASTM CLASSIFICATION
●	B18-3A	2.0	25.1	57	16	41	CH
⊠	B-18-5	0.0	21.8	41	17	24	
▲	B18-5	8.5	18.0	NP	NP	NP	ML
★	B18-7	2.0	25.5	59	20	39	
⊙	B18-9	2.0	24.7	50	16	34	
✿	B18-18	0.0	27.7	41	23	18	
○	B18-19	8.5	19.2	NP	NP	NP	SM
△	B18-21	0.0	20.9	35	21	14	CL
⊗	B18-25	0.0	21.3	31	19	12	CL
⊕	B18-28	13.5	7.6	26	15	11	CL
□	B18-29	0.0	22.8	33	18	15	
⊛	B18-31	0.0	16.7	31	22	9	CL
◒	B18-32	8.5	16.0	46	18	28	CL
☆	B18-33	0.0	21.1	31	20	11	
⊠	B18-36	0.0	22.5	50	20	30	
■	B18-37	8.5	21.5	23	18	5	

Job No: *18-G-21743*

Method: *ASTM D4318*

Date: *July 2018*

ATTERBERG LIMITS TEST RESULTS

Hillcrest Solar Project
Green Township, Brown County, Ohio

Geotechnical Consultants, Inc. - Westerville, Ohio 43081

ATTERBERG LIMITS

ASTM D 4318-17

Client:	Hull & Associates, Inc.	Boring No.:	B18-15
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	1
Lab ID:	2018-443-001-001	Soil Description:	BROWN LEAN CLAY

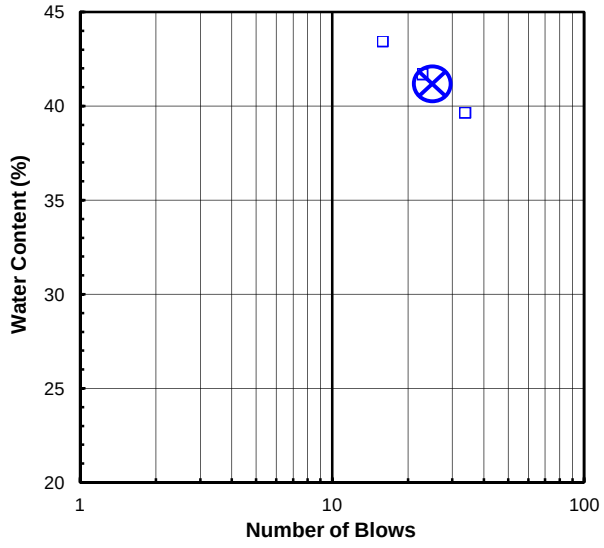
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-10		1	2	3	M
Tare Number:	2990	1280	295	366	U
Wt. of Tare & Wet Sample (g):	243.85	41.64	36.16	40.31	L
Wt. of Tare & Dry Sample (g):	201.05	35.53	30.05	33.28	T
Weight of Tare (g):	8.68	20.10	15.38	17.08	I
Weight of Water (g):	42.8	6.1	6.1	7.0	P
Weight of Dry Sample (g):	192.4	15.4	14.7	16.2	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**22.2**	**39.6**	**41.6**	**43.4**	N
Number of Blows:		**34**	**23**	**16**	T

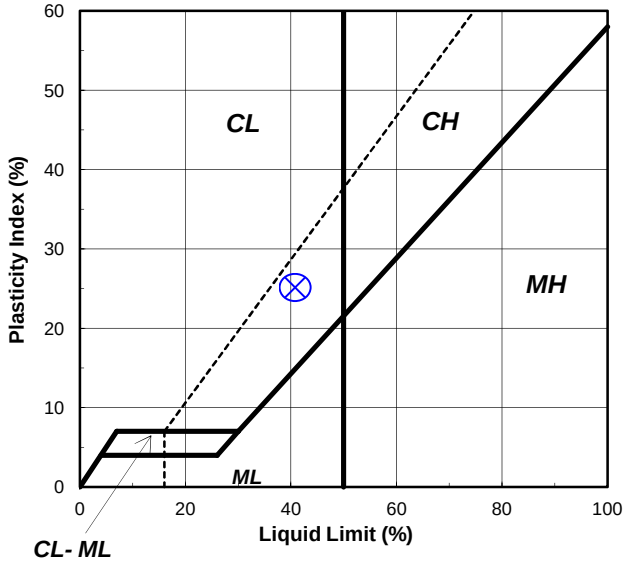
Plastic Limit Test	1	2	Range
Tare Number:	367	291	
Wt. of Tare & Wet Sample (g):	26.45	32.71	
Wt. of Tare & Dry Sample (g):	25.62	31.83	
Weight of Tare (g):	20.37	26.26	
Weight of Water (g):	0.8	0.9	
Weight of Dry Sample (g):	5.3	5.6	
Moisture Content (%):	**15.8**	**15.8**	**0.0**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**41**
Plastic Limit (%):	**16**
Plasticity Index (%):	**25**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By TO *Date* 7/25/18 *Checked By* KC *Date* 7/26/18

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Hull & Associates, Inc.	Boring No.:	B18-34
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	2
Lab ID:	2018-443-001-002	Soil Description:	BROWN FAT CLAY

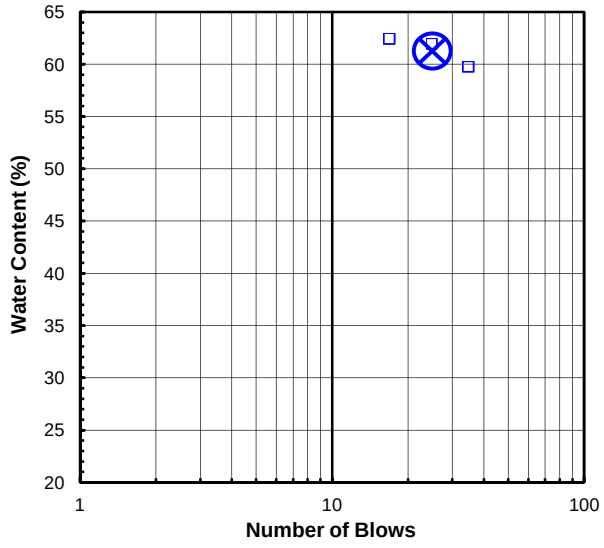
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-10		1	2	3	M
Tare Number:	3004	307	260	332	U
Wt. of Tare & Wet Sample (g):	256.93	40.04	39.53	39.89	L
Wt. of Tare & Dry Sample (g):	206.82	32.12	31.85	32.25	T
Weight of Tare (g):	8.20	19.42	19.44	19.45	I
Weight of Water (g):	50.1	7.9	7.7	7.6	P
Weight of Dry Sample (g):	198.6	12.7	12.4	12.8	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**25.2**	**62.4**	**61.9**	**59.7**	N
Number of Blows:		**17**	**25**	**35**	T

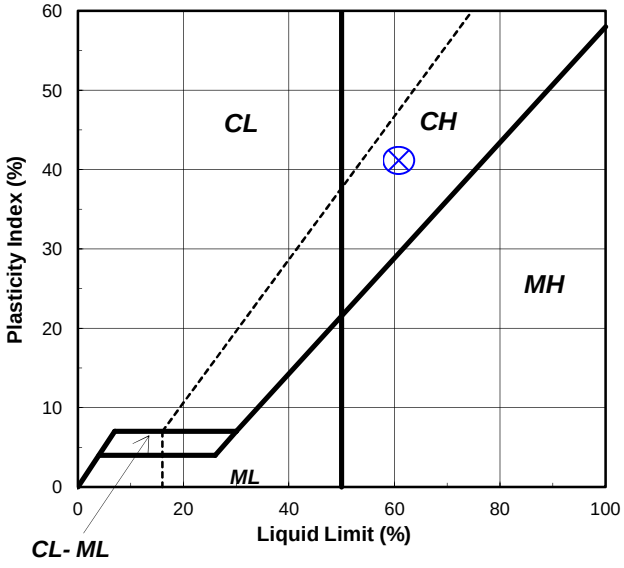
Plastic Limit Test	1	2	Range
Tare Number:	336	346	
Wt. of Tare & Wet Sample (g):	26.61	26.69	
Wt. of Tare & Dry Sample (g):	25.60	25.69	
Weight of Tare (g):	20.53	20.54	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.1	5.2	
Moisture Content (%):	**19.9**	**19.4**	**0.5**
Note: The acceptable range of the two Moisture Contents is ±			1.4

Test Results	
Liquid Limit (%):	**61**
Plastic Limit (%):	**20**
Plasticity Index (%):	**41**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 7/25/18 *Checked By* KC *Date* 7/26/18

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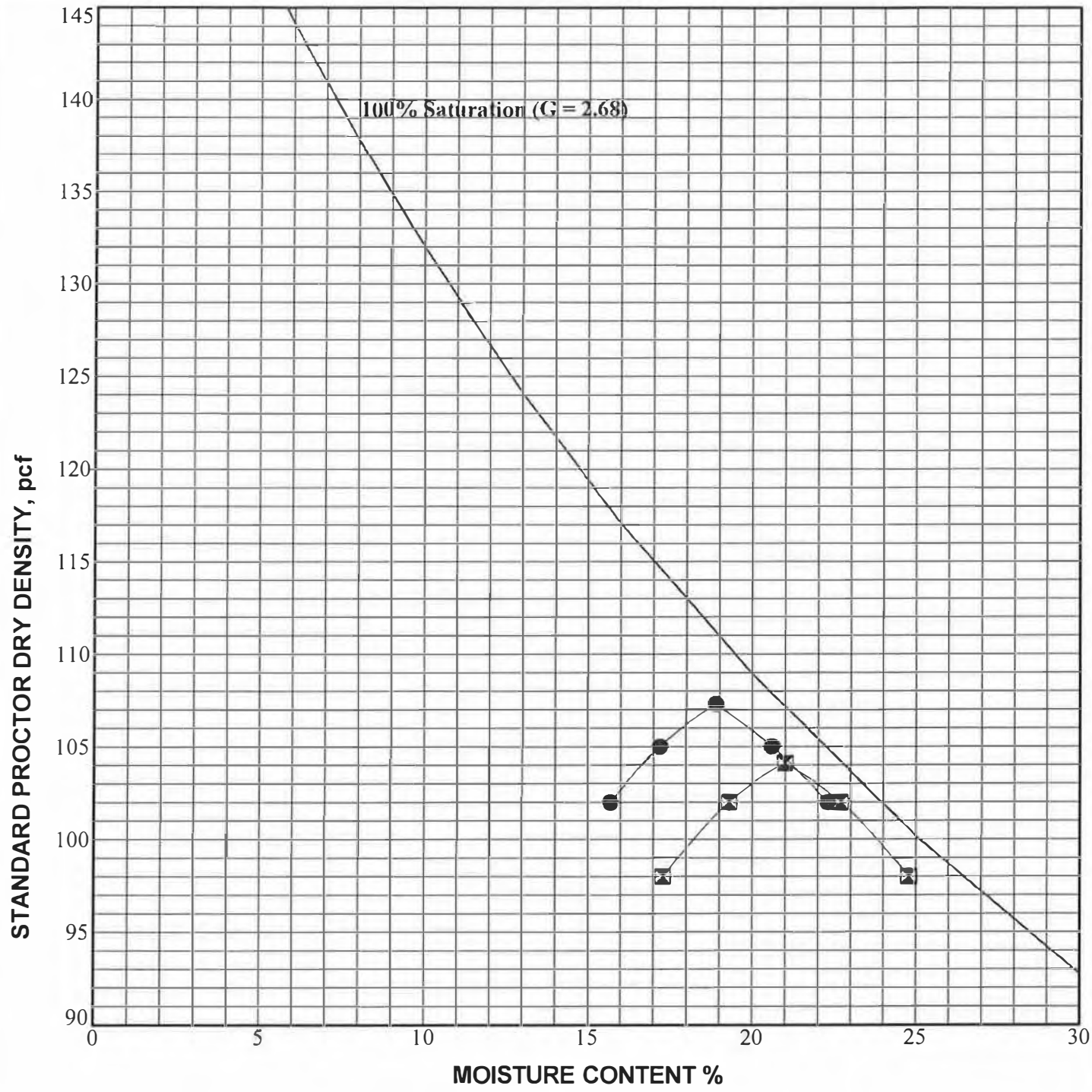
APPENDIX B-II

Appendix B-II Standard Proctor Testing



LEGEND:

	Test Hole	Depth	USCS Classification	Maximum Dry Density, pcf	Optimum Moisture Content, %	Natural Moisture Content, %	CBR*
●	B19-3	1-5'		107.3	18.9	24.2	---
⊠	B19-5	1-5'		104.1	21.0	26.1	4.8

Note: * CBR value at 98% Maximum Dry Density

Job No: *19-G-23125*

Method: *ASTM D698A*

Date: *October 2019*

LABORATORY COMPACTION TEST

Hillcrest Solar
Brown County, OH

Geotechnical Consultants, Inc. - Westerville, Ohio 43081

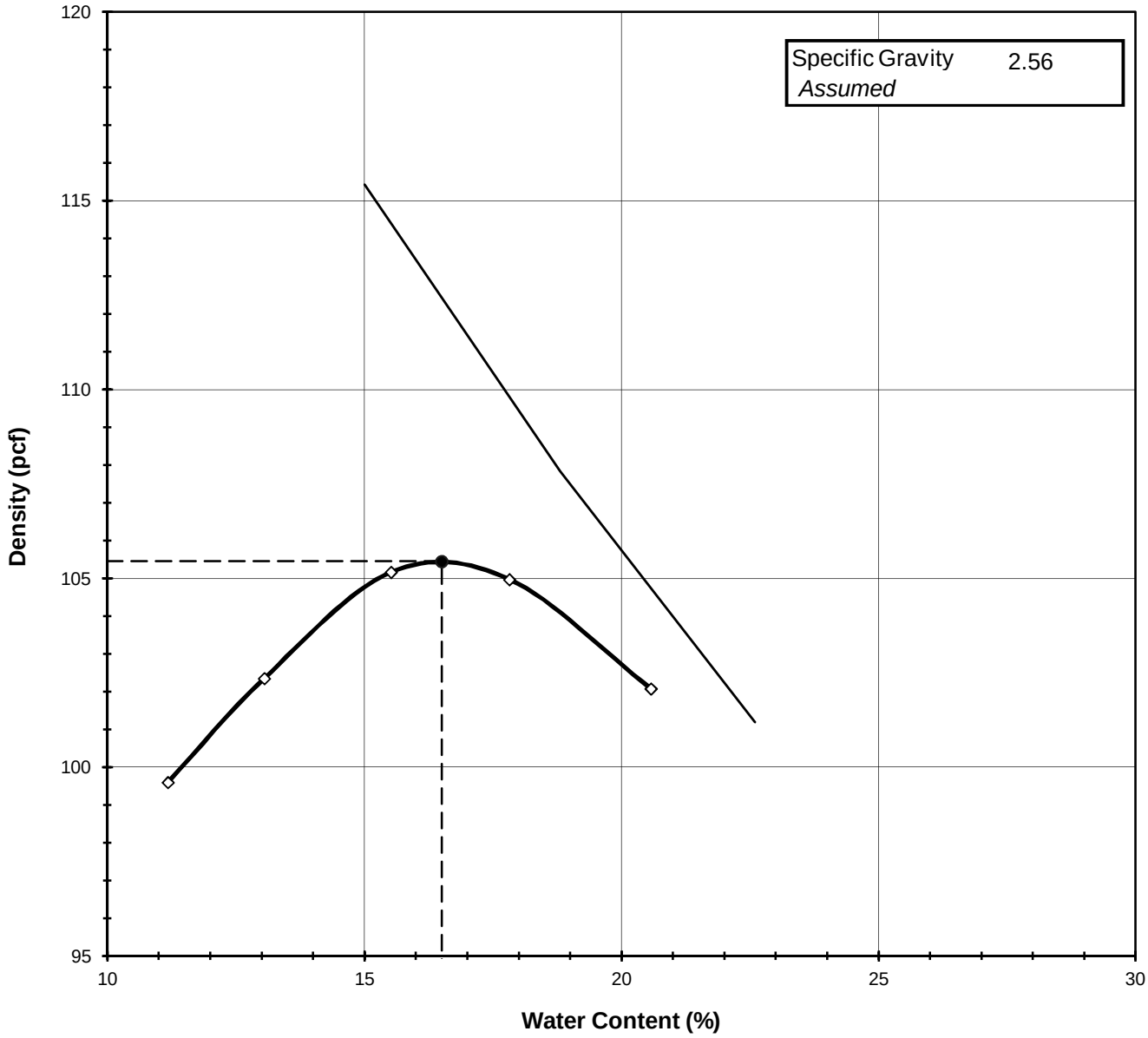
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	Hull & Associates, Inc.	Boring No.:	B18-15
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	1
Lab ID:	2018-443-001-001	Test Method	**STANDARD**

Visual Description: Brown Clay

Optimum Water Content **16.5**
Maximum Dry Density **105.5**



Tested By *PC* *Date* *7/23/18* *Checked By* *TMP* *Date* 7/24/18

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APPENDIX B-III

Thermal Resistivity Testing

THERMAL CONDUCTIVITY OF SOILS

ASTM D5334-14

Client:	Hull & Associates, Inc.	Boring No.:	B18-15
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	1
Lab ID:	2018-443-001-001		

Visual Description: Brown Clay

Mold / Specimen

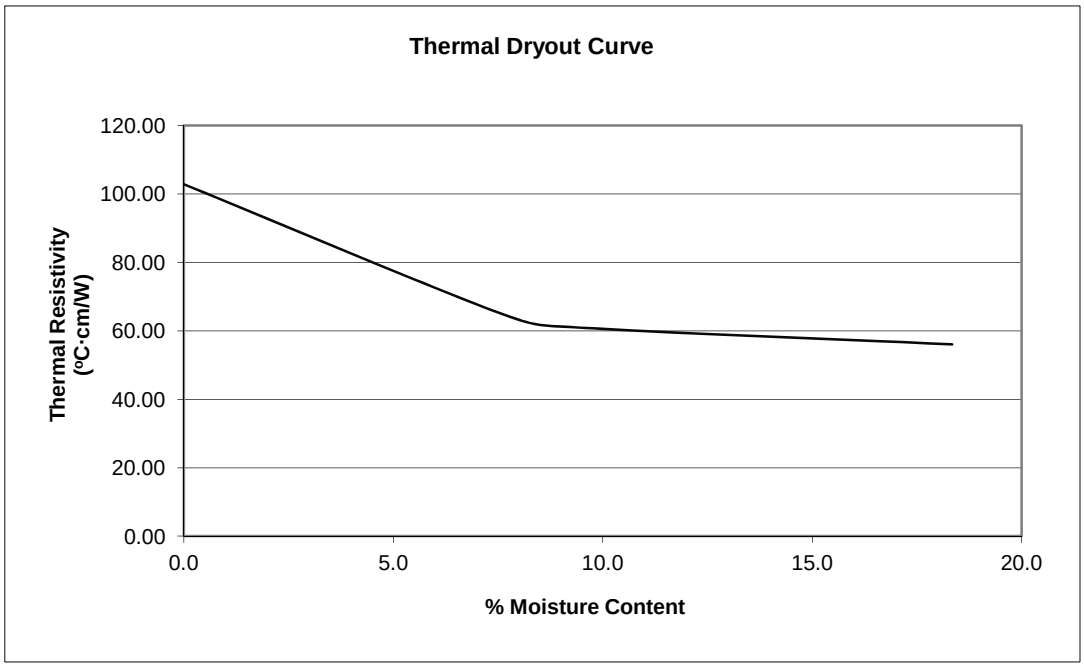
Point No.	**1**	**2**	**3**	**4**
Mold ID:	H	H	H	H
Weight of Sample and Mold (g):	2558	2503	2463	2287
Weight of Mold (g):	810	810	810	810
Sample Volume (cm^3):	887	887	887	887

Moisture Content / Density

Weight of Water (g):	271.00	216.00	176.00	0.00
Weight of Dry Sample (g):	1477.36	2287.00	2287.00	2287.00

Wet Density (g/cm^3):	1.97	1.91	1.86	1.67
Wet Density (pcf):	123.0	119.1	116.3	103.9
Moisture Content (%):	**18.3**	**9.4**	**7.7**	**0.0**
Dry Density (pcf):	**103.9**	**108.9**	**108.0**	**103.9**

Thermal Conductivity (W/(m·K))	1.785	1.641	1.551	0.973
Thermal Resistivity (^oC·cm/W)	56.03	60.93	64.47	102.80



Tested By SG *Date* 8/6/18 *Checked By* NJM *Date* 8/9/18

DCN: CT-S69, DATE: 4/20/18, REVISION: 1

S:Excel\Excel Qa\Spreadsheets\Thermal Conductivity (rem).xls

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APPENDIX B-IV

Appendix B-IV Corrosion Testing

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Hull & Associates, Inc.	Boring No.:	B19-5
Client Reference:	Hillcrest Solar INX001	Depth (ft):	1-5'
Project No.:	2019-469-001	Sample No.:	NA
Lab ID:	2019-469-001-001	Description:	Brown Clay

(- # 10 Sieve material)

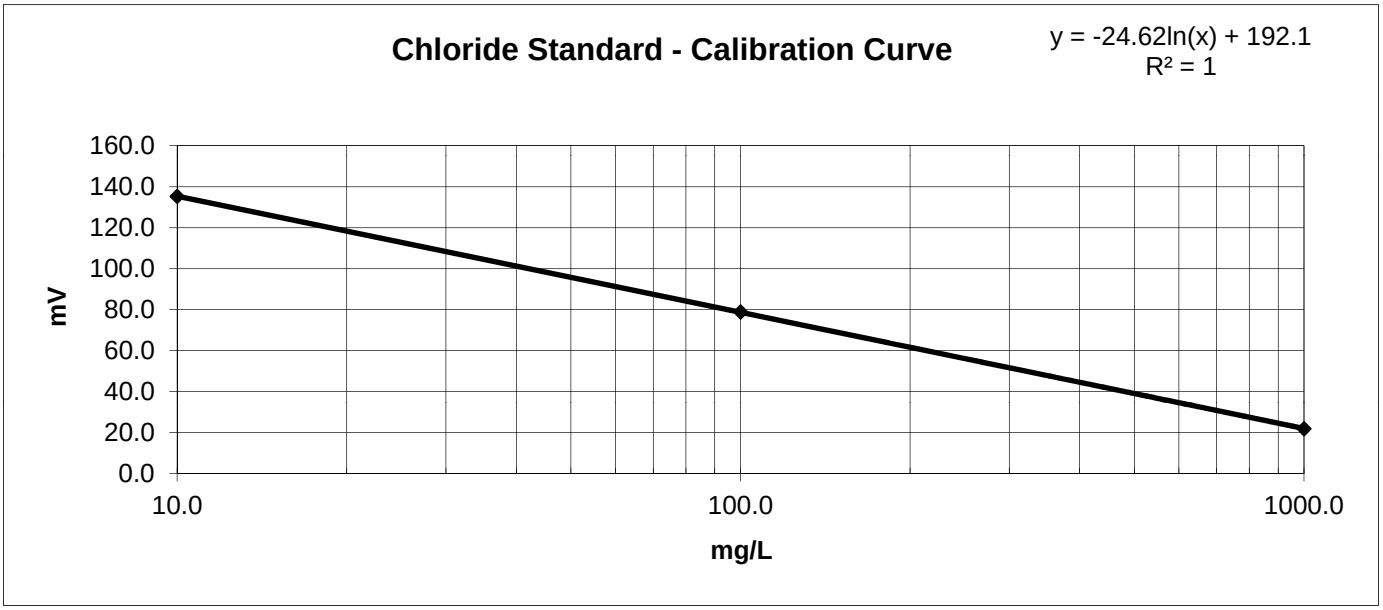
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	135.3
100.0	mg/L	78.9
1000.0	mg/L	21.9

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	144.0	7.05	7.05

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	8/21/19	Checked By	BRB	Date	8/23/19

DCN: CT-S63A Date: 6/2/14 Rev. 1

S:\Excel\Excel QA\Spreadsheets\Chloride T291.xls

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Hull & Associates, Inc.
Client Reference:	Hillcrest Solar INX001
Project No.:	2019-469-001

Lab ID:	001
Boring No.:	B19-5
Depth (ft):	1-5'
Sample No.:	NA
Drying Tare No.:	1601
Testing Tare No.:	K
Temperature (^{o}C):	20.5
pH of Sample:	**5.98**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	3.97	ORION 720A
7.00	6.95	
10.00	10.01	

Tested By JAM Date 8/19/19 Checked By BRB Date 8/21/19

DCN: CT-S36B DATE 6/5/14 REVISION: 1

S:\Excel\Excel QA\Spreadsheets\pH T289.xls

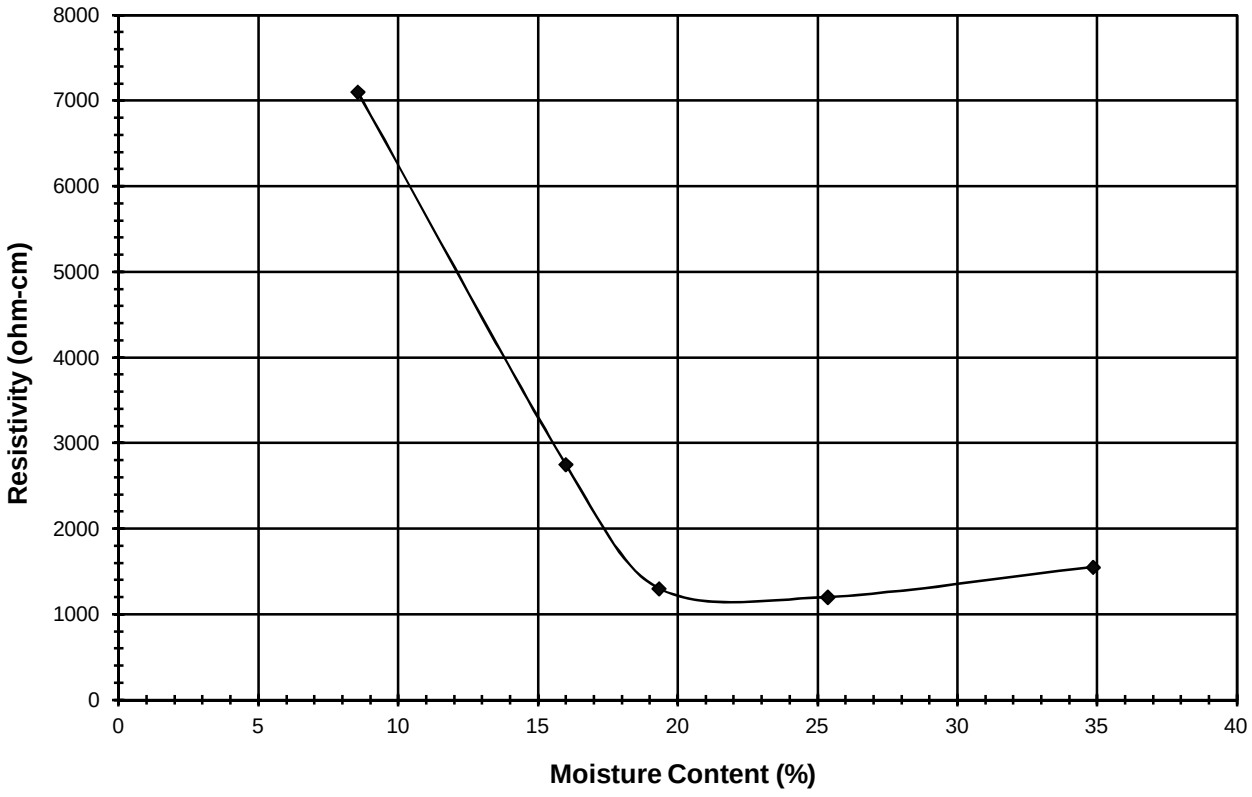
Minimum Resistivity

AASHTO T288-12

Client:	Hull & Associates, Inc.	Boring No.:	B19-5
Client Reference:	Hillcrest Solar INX001	Depth (ft):	1-5'
Project No.:	2019-469-001	Sample No.:	NA
Lab ID:	2019-469-001-001	Visual Description:	Brown Clay
		(- #10 Sieve material)	

Tare No.:	279	270	256	394	454
Tare & Wet Specimen (g):	41.20	39.27	58.77	53.95	50.84
Tare & Dry Specimen (g):	39.67	35.46	53.21	45.88	41.54
Tare Weight (g):	21.77	11.62	24.43	14.05	14.85
Moisture Content (%):	**8.5**	**16.0**	**19.3**	**25.4**	**34.8**
Resistance (ohm):	**7100**	**2750**	**1300**	**1200**	**1550**
Resistivity (ohm-cm):	**7100**	**2750**	**1300**	**1200**	**1550**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 8/19/19 *Checked By* BRB *Date* 8/21/19

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Hull & Associates, Inc.	Boring No.:	B19-5
Client Reference:	Hillcrest Solar INX001	Depth (ft):	1-5'
Project No.:	2019-469-001	Sample No.:	NA
Lab ID:	2019-469-001-001	Soil Description:	Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	12	34	62	84	175	247	336

Measurement of Barium Chloride Turbidity

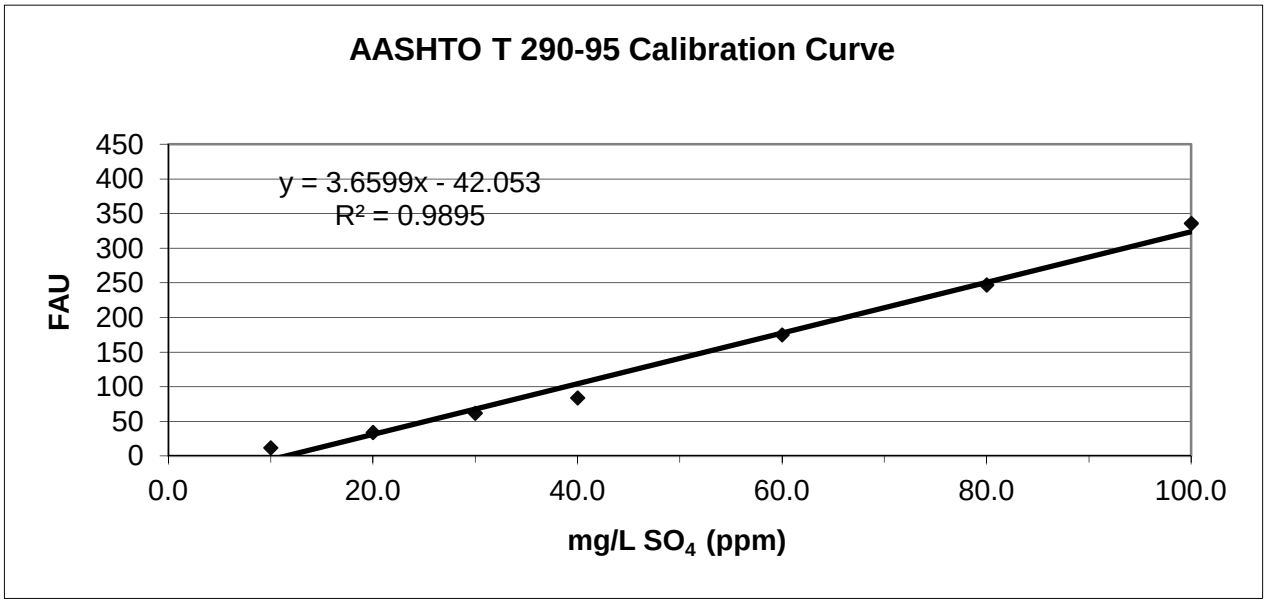
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	51
NaCl Solution Mix Date:	5/15/19

Sample Moisture Content

Tare Number:	884
Weight of Tare & Wet Sample (g):	224.15
Weight of Tare & Dry Sample (g):	219.43
Weight of Tare (g):	109.36
Weight of Water (g):	4.72
Weight of Dry Sample (g):	110.07
Moisture Content (%):	4.29

Sample Sulfate Ion Concentration:	25.42	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	76.3	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	79.7	**mg/Kg SO4 (corrected for moisture)**



Tested by:	JAM	Date:	8/21/19	Checked by:	BRB	Date:	8/23/19

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Report for Boring B19-5 sample 1 to 5 feet

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-94915-1
Client Project/Site: Geotechnics, Hull & Associates

For:
Geotechnics Inc.
544 Braddock Ave
East Pittsburgh, Pennsylvania 15112

Attn: Caleb Kyper

Authorized for release by:
9/13/2019 9:32:16 AM

David Dunlap, Senior Project Manager
(412)963-2432
david.dunlap@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

PA Lab ID: 02-00416

Table of Contents

Case Narrative

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Job ID: 180-94915-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-94915-1

Receipt
The sample was received on 8/29/2019 3:51 PM; the sample arrived in good condition. The temperature of the cooler at receipt was 21.8º C. The sample was not received on ice.

General Chemistry
Method(s) 9034: The sulfide analysis was completed on 8/31/19. It was noted after the analysis was completed, during review of the data, that the sodium thiosulfate titrant used in the sulfide analysis had expired on 8/30/19. The sodium thiosulfate solution is standardized prior to each use for analysis, therefore, the impact to the sample analysis would be minimal.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geotechnics Inc. Job ID: 180-94915-1
Project/Site: Geotechnics, Hull & Associates

Laboratory: Eurofins TestAmerica, Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Pennsylvania	NELAP	02-00416	04-30-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte

Sample Summary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-94915-1	2019-469-001-001	Solid	08/29/19 00:00	08/29/19 15:51	

Method Summary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Method	Method Description	Protocol	Laboratory
2540G	SM 2540G	SM22	TAL PIT
EPA 9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL PIT
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	TAL PIT

Protocol References:

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Client Sample ID: 2019-469-001-001
Date Collected: 08/29/19 00:00
Date Received: 08/29/19 15:51

Lab Sample ID: 180-94915-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			290478	09/06/19 12:05	PM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: 2019-469-001-001
Date Collected: 08/29/19 00:00
Date Received: 08/29/19 15:51

Lab Sample ID: 180-94915-1
Matrix: Solid
Percent Solids: 96.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			5.03 mL	50 mL	289925	08/31/19 11:54	MRD	TAL PIT
Total/NA	Analysis	EPA 9034		1			289938	08/31/19 15:13	MRD	TAL PIT
	Instrument ID: NOEQUIP									

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

MRD = Madeline Daugherty

Batch Type: Analysis

MRD = Madeline Daugherty

PM = Paloma Hoelzle

Client Sample Results

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Client Sample ID: 2019-469-001-001

Lab Sample ID: 180-94915-1
Date Collected: 08/29/19 00:00
Matrix: Solid
Date Received: 08/29/19 15:51

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	3.4		0.1	0.1	%			09/06/19 12:05	1
Percent Solids	96.6		0.1	0.1	%			09/06/19 12:05	1

Client Sample ID: 2019-469-001-001

Lab Sample ID: 180-94915-1
Date Collected: 08/29/19 00:00
Matrix: Solid
Date Received: 08/29/19 15:51
Percent Solids: 96.6

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	14	J	31	10	mg/Kg	☼	08/31/19 11:54	08/31/19 15:13	1

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates

Job ID: 180-94915-1

Method: EPA 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 180-289925/1-A
Matrix: Solid
Analysis Batch: 289938

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 289925

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		30	10	mg/Kg		08/31/19 11:54	08/31/19 15:13	1

Lab Sample ID: LCS 180-289925/2-A
Matrix: Solid
Analysis Batch: 289938

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 289925

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			126	122		mg/Kg		97	85 - 115		

QC Association Summary

Client: Geotechnics Inc.
Job ID: 180-94915-1
Project/Site: Geotechnics, Hull & Associates

General Chemistry

Prep Batch: 289925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94915-1	2019-469-001-001	Total/NA	Solid	9030B	
MB 180-289925/1-A	Method Blank	Total/NA	Solid	9030B	
LCS 180-289925/2-A	Lab Control Sample	Total/NA	Solid	9030B	

Analysis Batch: 289938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94915-1	2019-469-001-001	Total/NA	Solid	EPA 9034	289925
MB 180-289925/1-A	Method Blank	Total/NA	Solid	EPA 9034	289925
LCS 180-289925/2-A	Lab Control Sample	Total/NA	Solid	EPA 9034	289925

Analysis Batch: 290478

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94915-1	2019-469-001-001	Total/NA	Solid	2540G	

Login Sample Receipt Checklist

Client: Geotechnics Inc.

Job Number: 180-94915-1

Login Number: 94915
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	False	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-9
Lab ID:	2019-536-001-001	Description:	Brown Clay

(- # 10 Sieve material)

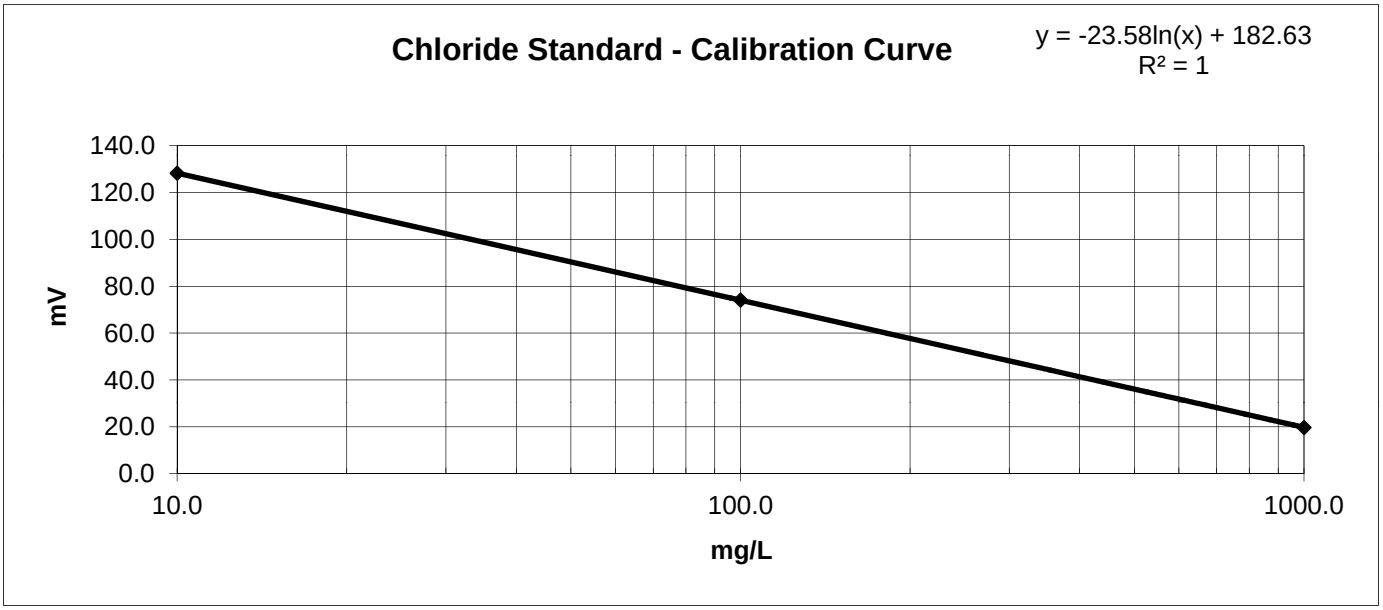
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	128.3
100.0	mg/L	74.1
1000.0	mg/L	19.7

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	111.4	20.50	20.50

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	9/6/19	Checked By	KC	Date	9/9/19

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Geotechnical Consultants, Inc.
Client Reference:	Corrosion Testing
Project No.:	2019-536-001

Lab ID:	001
Boring No.:	NA
Depth (ft):	NA
Sample No.:	B19-9
Drying Tare No.:	D
Testing Tare No.:	I
Temperature (^{o}C):	21.3
pH of Sample:	**4.05**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	7.00	
10.00	9.99	

Tested By JAM Date 9/5/19 Checked By KC Date 9/9/19

DCN: CT-S36B DATE 6/5/14 REVISION: 1

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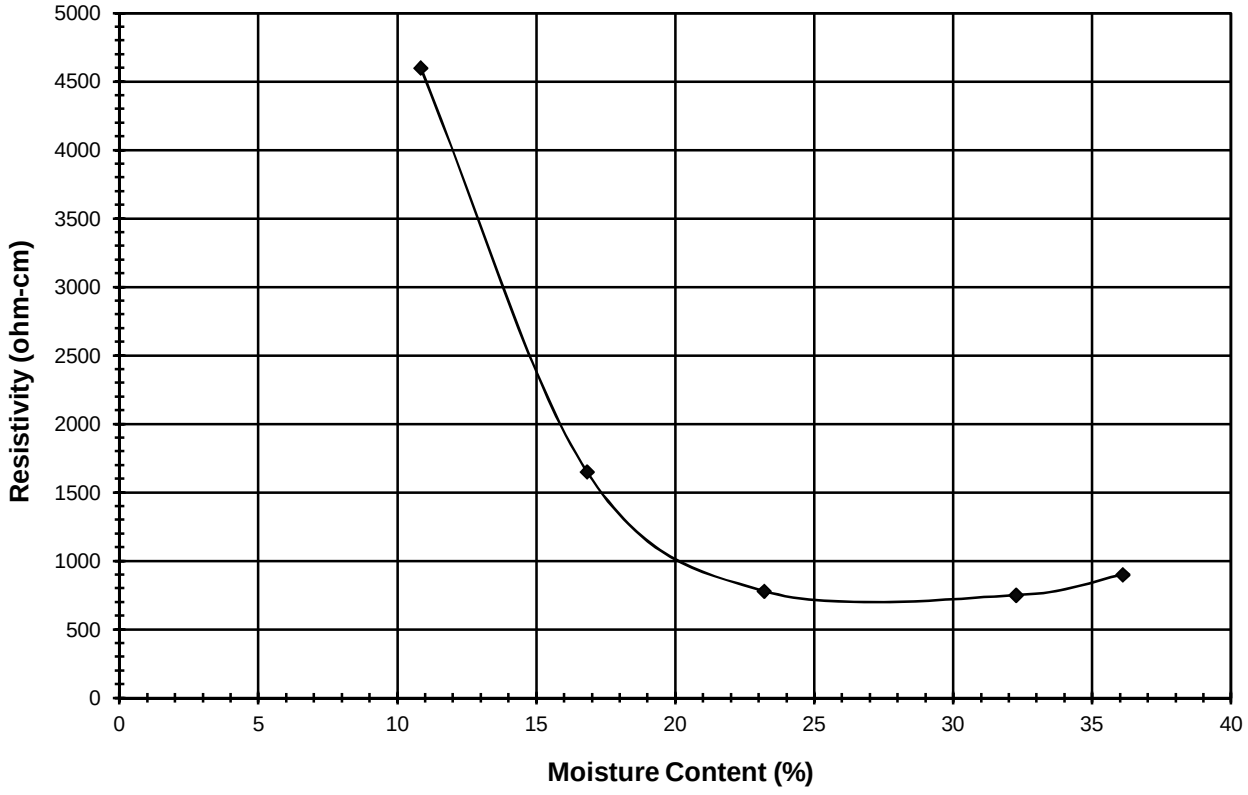
Minimum Resistivity

AASHTO T288-12

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-9
Lab ID:	2019-536-001-001	Visual Description:	Brown Clay
		(- #10 Sieve material)	

Tare No.:	269	254	454	442	241
Tare & Wet Specimen (g):	45.43	51.76	55.56	47.53	47.94
Tare & Dry Specimen (g):	42.94	47.70	47.90	39.85	40.14
Tare Weight (g):	19.95	23.56	14.87	16.04	18.53
Moisture Content (%):	**10.8**	**16.8**	**23.2**	**32.3**	**36.1**
Resistance (ohm):	**4600**	**1650**	**780**	**750**	**900**
Resistivity (ohm-cm):	**4600**	**1650**	**780**	**750**	**900**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 9/6/19 *Checked By* KC *Date* 9/9/19

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-9
Lab ID:	2019-536-001-001	Soil Description:	Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	11	27	57	87	155	237	316

Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

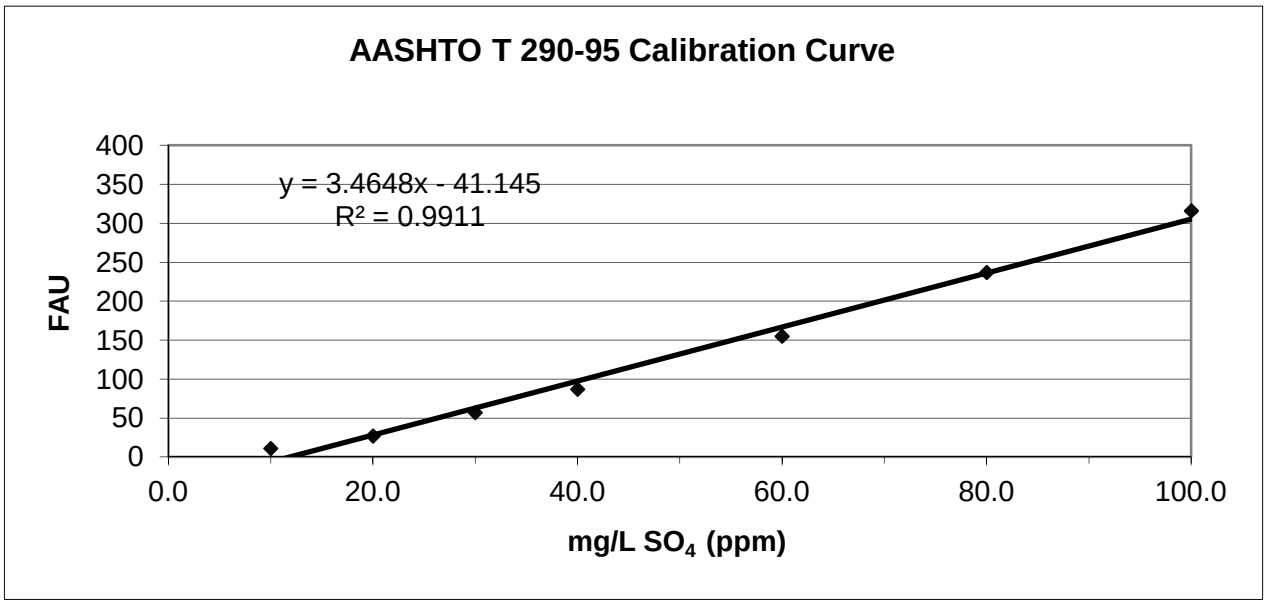
Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	106
NaCl Solution Mix Date:	9/3/19

Sample Moisture Content

Tare Number:	1744
Weight of Tare & Wet Sample (g):	204.95
Weight of Tare & Dry Sample (g):	199.21
Weight of Tare (g):	83.11
Weight of Water (g):	5.74
Weight of Dry Sample (g):	116.10
Moisture Content (%):	4.94

Note: 10 ml of sample diluted to 50 ml = Dilution Factor of 5.

Sample Sulfate Ion Concentration:	212.35	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	637.0	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	670.2	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 9/9/19 Checked by: KC Date: 9/9/19

DCN: CT-T290 DATE: 8/5/2019 REV: 1 S:\Excel\Excel QA\Spreadsheets\Sulfate T290

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-15
Lab ID:	2019-536-001-002	Description:	Brown Clay

(- # 10 Sieve material)

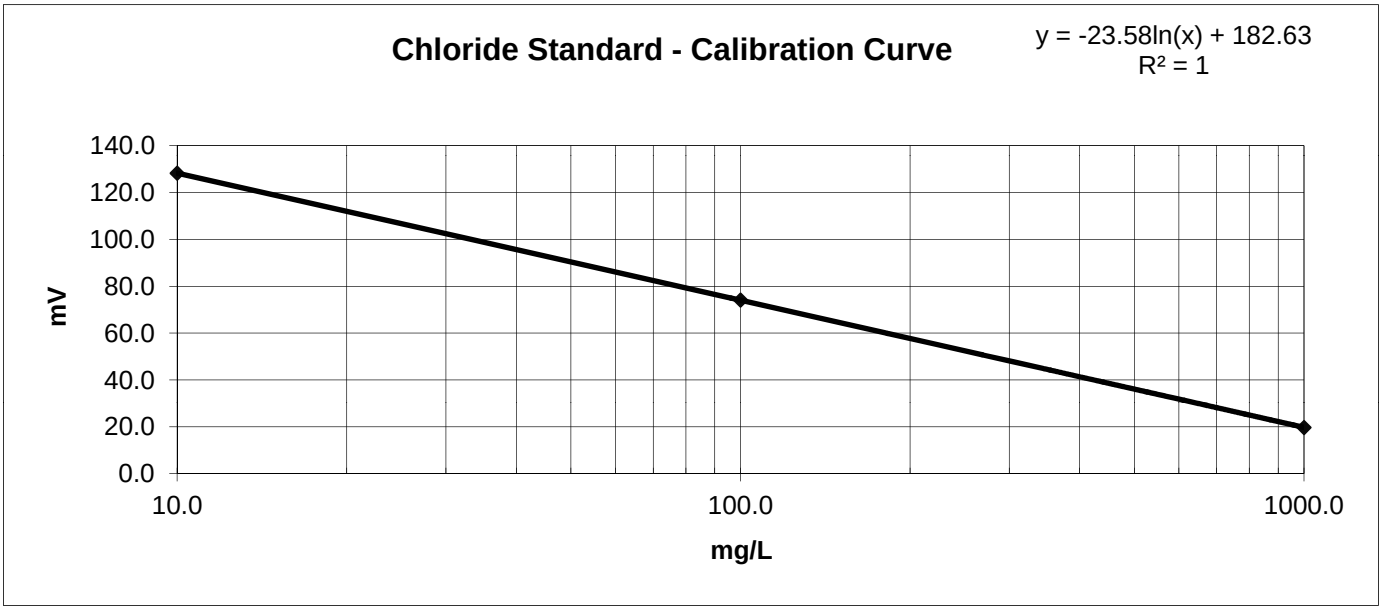
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	128.3
100.0	mg/L	74.1
1000.0	mg/L	19.7

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	105.9	25.89	25.89

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	9/6/19	Checked By	KC	Date	9/9/19

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Geotechnical Consultants, Inc.
Client Reference:	Corrosion Testing
Project No.:	2019-536-001

Lab ID:	002
Boring No.:	NA
Depth (ft):	NA
Sample No.:	B19-15
Drying Tare No.:	C
Testing Tare No.:	J
Temperature (^{o}C):	21.3
pH of Sample:	**4.60**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	7.00	
10.00	9.99	

Tested By JAM Date 9/5/19 Checked By KC Date 9/9/19

DCN: CT-S36B DATE 6/5/14 REVISION: 1

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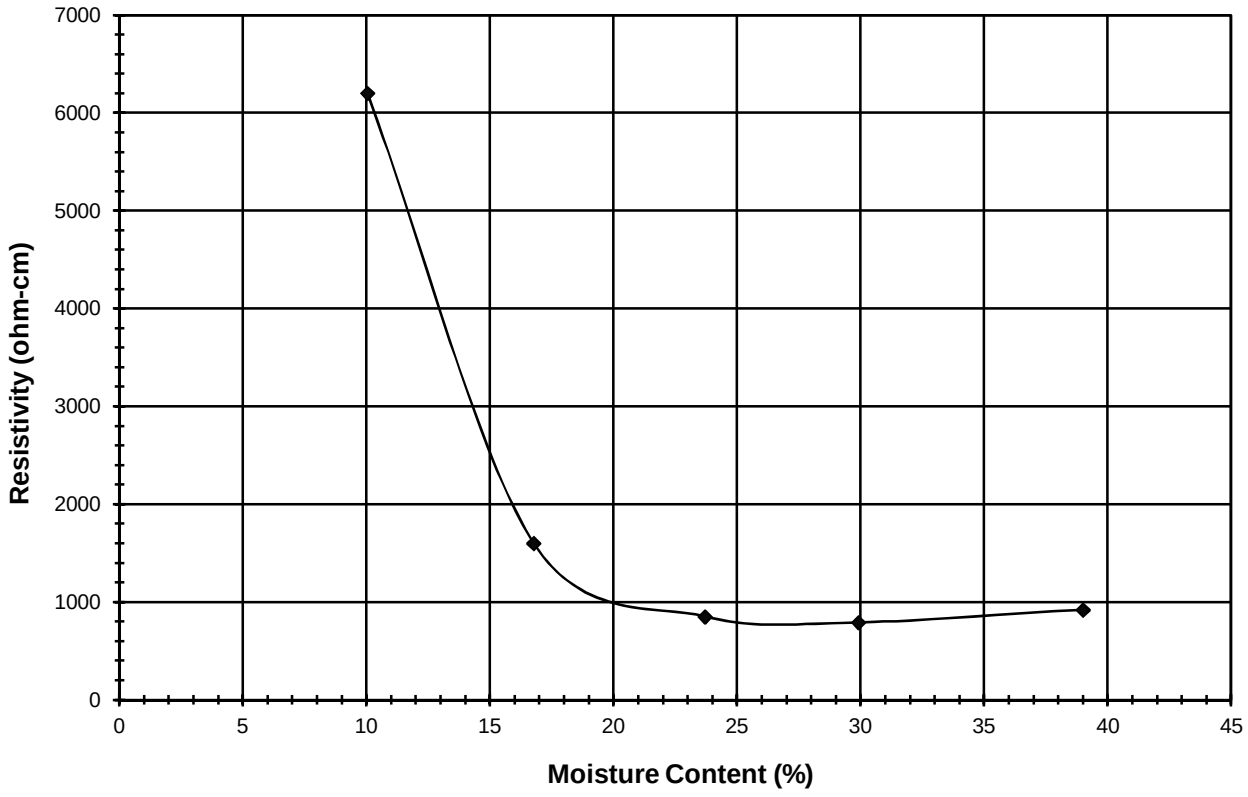
Minimum Resistivity

AASHTO T288-12

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-15
Lab ID:	2019-536-001-002	Visual Description:	Brown Clay
		(- #10 Sieve material)	

Tare No.:	273	4	239	262	267
Tare & Wet Specimen (g):	48.23	53.33	57.94	44.29	72.45
Tare & Dry Specimen (g):	46.31	48.39	50.71	36.57	58.22
Tare Weight (g):	27.18	18.92	20.20	10.76	21.73
Moisture Content (%):	**10.0**	**16.8**	**23.7**	**29.9**	**39.0**
Resistance (ohm):	**6200**	**1600**	**850**	**790**	**920**
Resistivity (ohm-cm):	**6200**	**1600**	**850**	**790**	**920**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 9/6/19 *Checked By* KC *Date* 9/9/19

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-15
Lab ID:	2019-536-001-002	Soil Description:	Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	11	27	57	87	155	237	316

Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

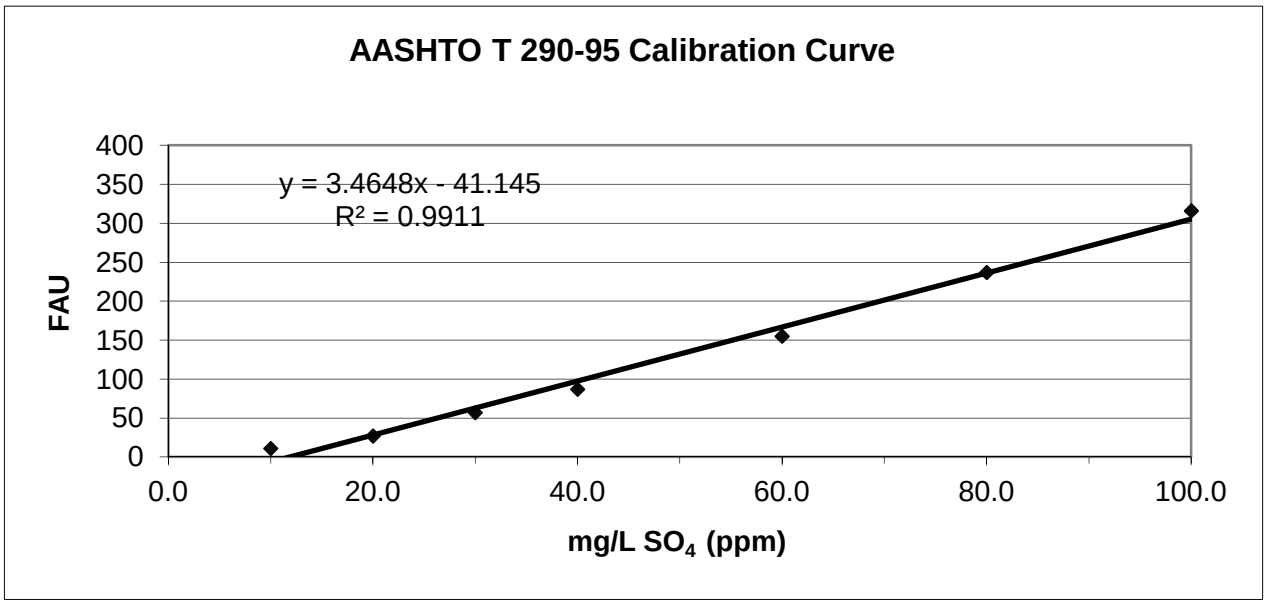
Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	223
NaCl Solution Mix Date:	9/3/19

Sample Moisture Content

Tare Number:	579
Weight of Tare & Wet Sample (g):	194.55
Weight of Tare & Dry Sample (g):	189.48
Weight of Tare (g):	82.75
Weight of Water (g):	5.07
Weight of Dry Sample (g):	106.73
Moisture Content (%):	4.75

Note: 25 ml of sample diluted to 50 ml = Dilution Factor of 2.

Sample Sulfate Ion Concentration:	152.48	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	457.4	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	480.2	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 9/9/19 Checked by: KC Date: 9/9/19

DCN: CT-T290 DATE: 8/5/2019 REV: 1 S:\Excel\Excel QA\Spreadsheets\Sulfate T290

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-26
Lab ID:	2019-536-001-003	Description:	Dark Brown Clay

(- # 10 Sieve material)

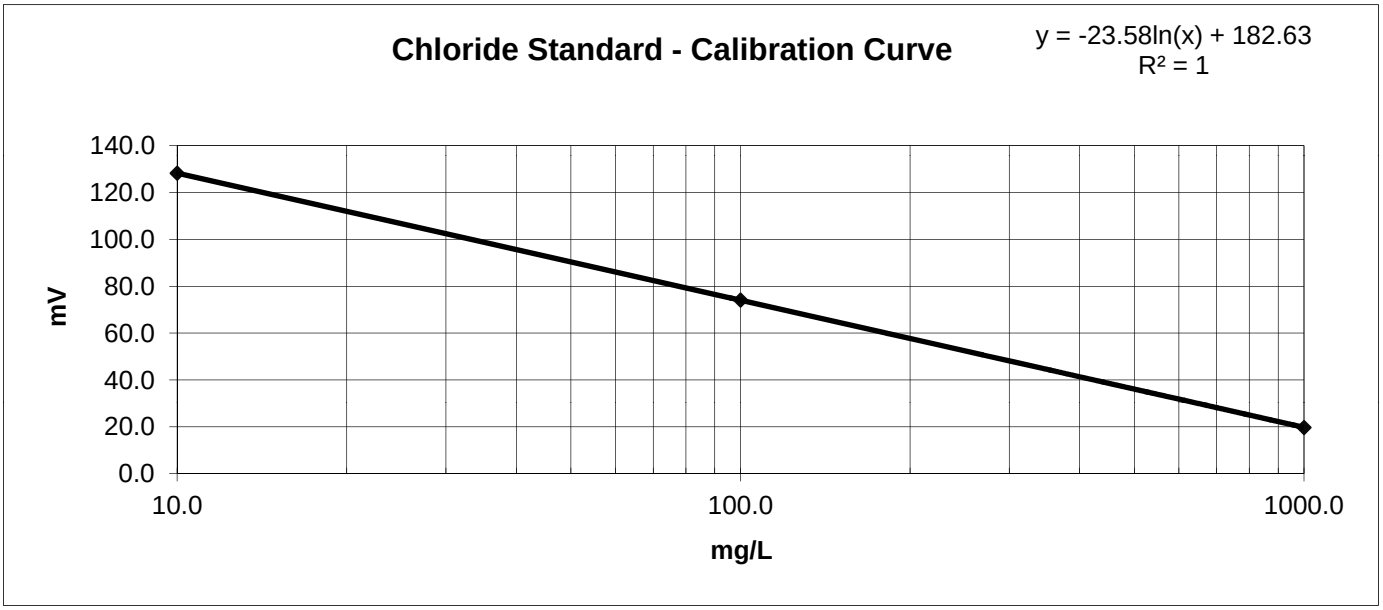
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	128.3
100.0	mg/L	74.1
1000.0	mg/L	19.7

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	136.7	7.01	7.01

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	9/6/19	Checked By	KC	Date	9/9/19

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Geotechnical Consultants, Inc.
Client Reference:	Corrosion Testing
Project No.:	2019-536-001

Lab ID:	003
Boring No.:	NA
Depth (ft):	NA
Sample No.:	B19-26
Drying Tare No.:	B
Testing Tare No.:	G
Temperature (^{o}C):	21.3
pH of Sample:	**6.04**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	7.00	
10.00	9.99	

Tested By JAM Date 9/5/19 Checked By KC Date 9/9/19

DCN: CT-S36B DATE 6/5/14 REVISION: 1

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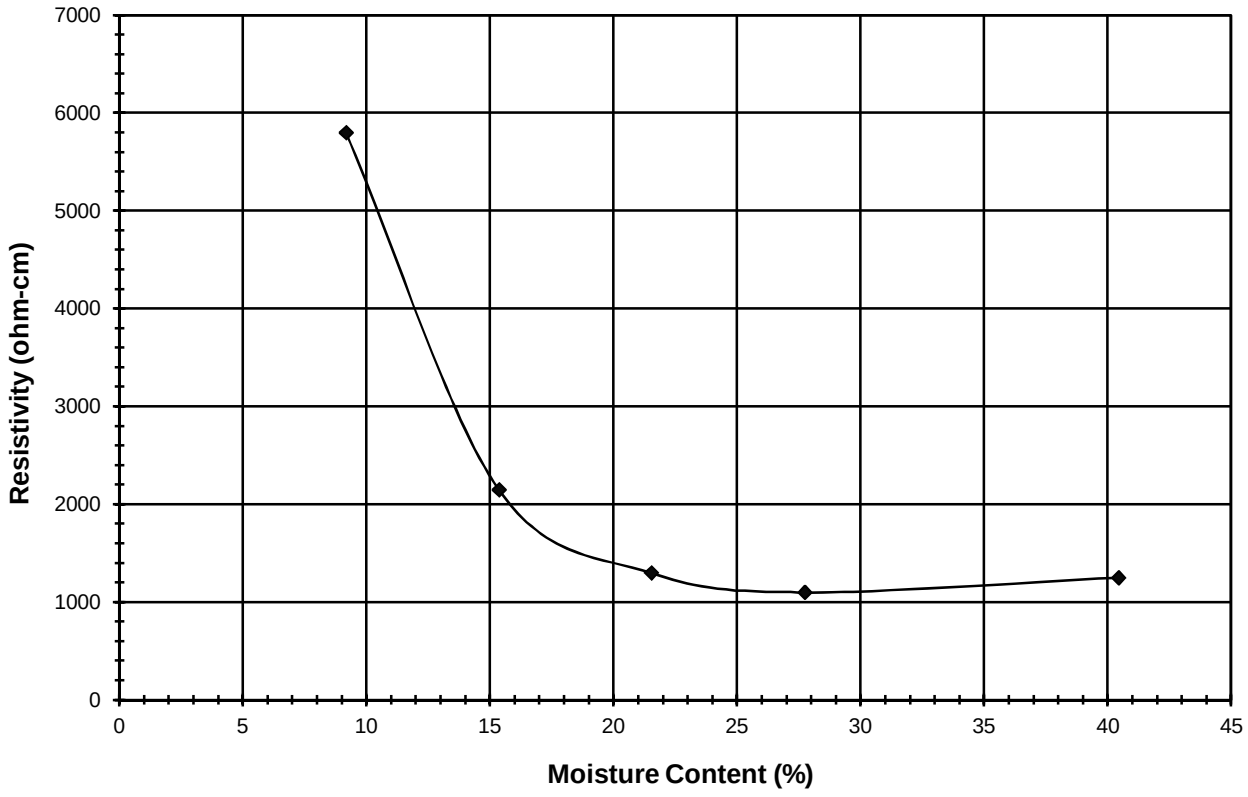
Minimum Resistivity

AASHTO T288-12

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-26
Lab ID:	2019-536-001-003	Visual Description:	Dark Brown Clay
		(- #10 Sieve material)	

Tare No.:	229	1106	256	274	266
Tare & Wet Specimen (g):	39.61	42.84	57.13	42.67	42.46
Tare & Dry Specimen (g):	37.81	39.51	51.34	36.19	34.19
Tare Weight (g):	18.18	17.83	24.44	12.83	13.74
Moisture Content (%):	**9.2**	**15.4**	**21.5**	**27.7**	**40.4**
Resistance (ohm):	**5800**	**2150**	**1300**	**1100**	**1250**
Resistivity (ohm-cm):	**5800**	**2150**	**1300**	**1100**	**1250**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 9/6/19 *Checked By* KC *Date* 9/9/19

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-26
Lab ID:	2019-536-001-003	Soil Description:	Dark Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	11	27	57	87	155	237	316

Measurement of Barium Chloride Turbidity

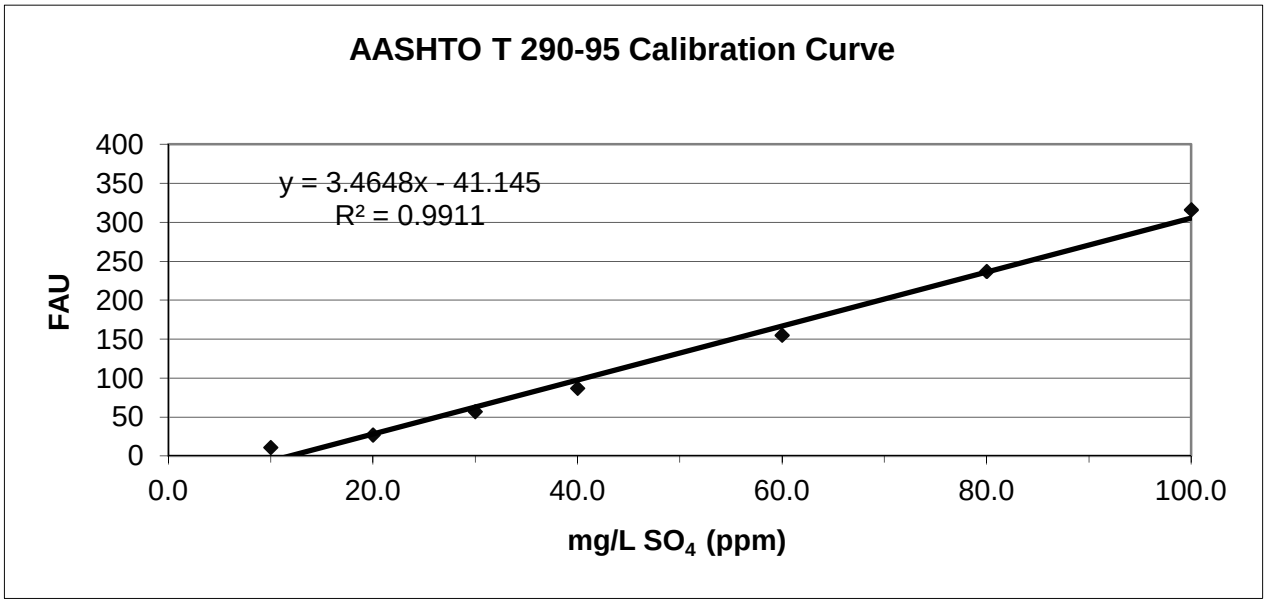
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	72
NaCl Solution Mix Date:	9/3/19

Sample Moisture Content

Tare Number:	887
Weight of Tare & Wet Sample (g):	228.41
Weight of Tare & Dry Sample (g):	223.51
Weight of Tare (g):	109.58
Weight of Water (g):	4.90
Weight of Dry Sample (g):	113.93
Moisture Content (%):	4.30

Sample Sulfate Ion Concentration:	32.66	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	98.0	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	102.4	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 9/9/19 Checked by: KC Date: 9/9/19

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CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-40
Lab ID:	2019-536-001-004	Description:	Brown Clay

(- # 10 Sieve material)

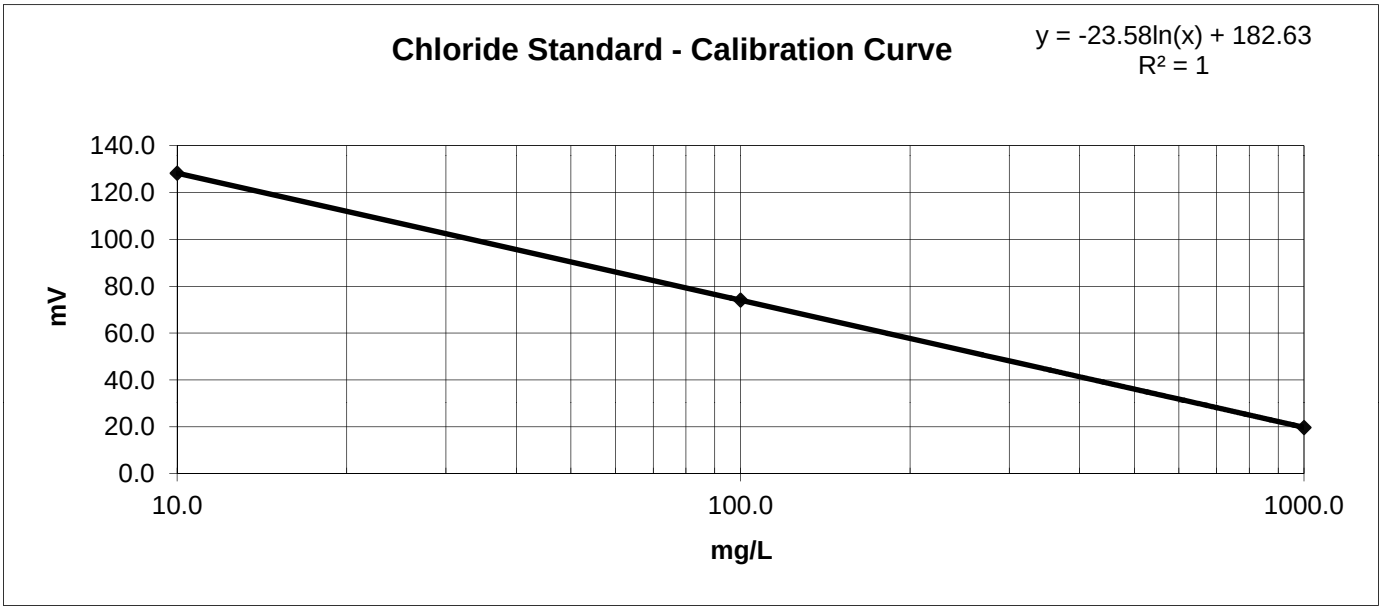
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	128.3
100.0	mg/L	74.1
1000.0	mg/L	19.7

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	104.2	27.83	27.83

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	9/6/19	Checked By	KC	Date	9/9/19

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Geotechnical Consultants, Inc.
Client Reference:	Corrosion Testing
Project No.:	2019-536-001

Lab ID:	004
Boring No.:	NA
Depth (ft):	NA
Sample No.:	B19-40
Drying Tare No.:	A
Testing Tare No.:	R
Temperature (^{o}C):	21.3
pH of Sample:	**4.21**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	7.00	
10.00	9.99	

Tested By JAM Date 9/5/19 Checked By KC Date 9/9/19

DCN: CT-S36B DATE 6/5/14 REVISION: 1

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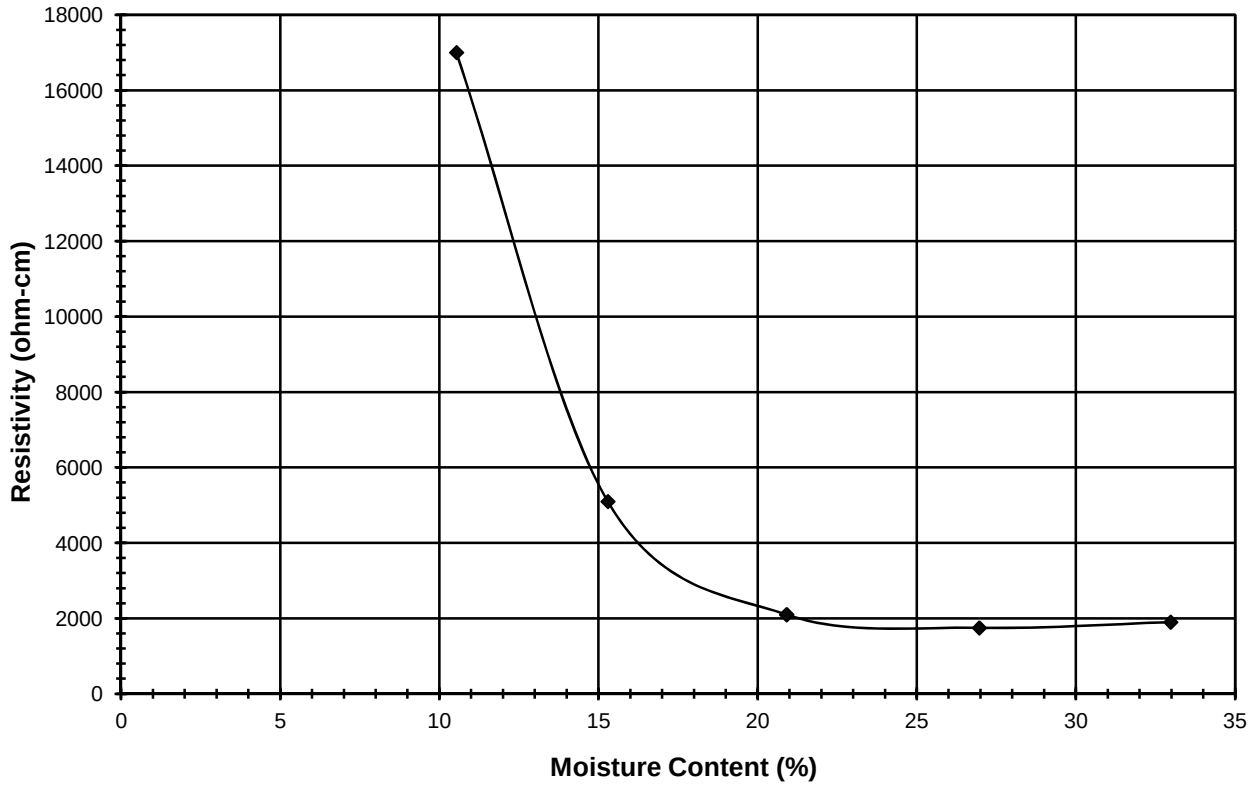
Minimum Resistivity

AASHTO T288-12

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-40
Lab ID:	2019-536-001-004	Visual Description:	Brown Clay
		(- #10 Sieve material)	

Tare No.:	279	270	259	263	394
Tare & Wet Specimen (g):	43.59	37.10	51.38	60.50	64.60
Tare & Dry Specimen (g):	41.51	33.72	46.04	51.98	52.07
Tare Weight (g):	21.77	11.62	20.50	20.38	14.07
Moisture Content (%):	**10.5**	**15.3**	**20.9**	**27.0**	**33.0**
Resistance (ohm):	**17000**	**5100**	**2100**	**1750**	**1900**
Resistivity (ohm-cm):	**17000**	**5100**	**2100**	**1750**	**1900**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 9/6/19 *Checked By* KC *Date* 9/9/19

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Geotechnical Consultants, Inc.	Boring No.:	NA
Client Reference:	Corrosion Testing	Depth (ft):	NA
Project No.:	2019-536-001	Sample No.:	B19-40
Lab ID:	2019-536-001-004	Soil Description:	Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	11	27	57	87	155	237	316

Measurement of Barium Chloride Turbidity

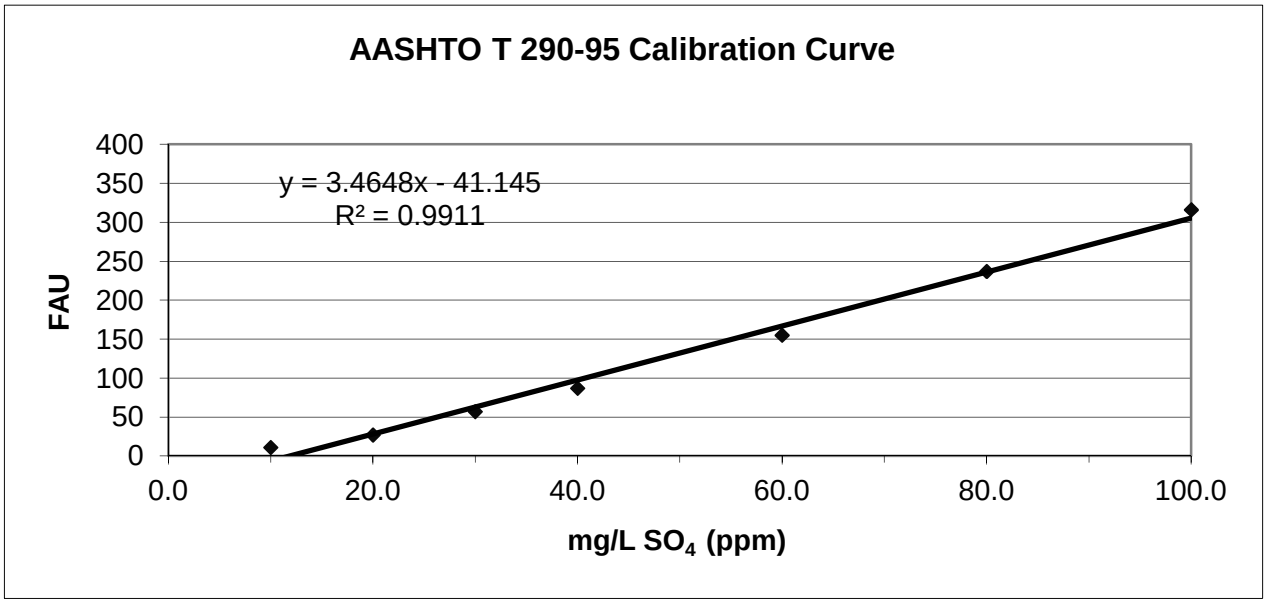
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	82
NaCl Solution Mix Date:	9/3/19

Sample Moisture Content

Tare Number:	561
Weight of Tare & Wet Sample (g):	199.12
Weight of Tare & Dry Sample (g):	194.27
Weight of Tare (g):	86.04
Weight of Water (g):	4.85
Weight of Dry Sample (g):	108.23
Moisture Content (%):	4.48

Sample Sulfate Ion Concentration:	35.54	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	106.6	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	111.6	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 9/9/19 Checked by: KC Date: 9/9/19

DCN: CT-T290 DATE: 8/5/2019 REV: 1 S:\Excel\Excel QA\Spreadsheets\Sulfate T290

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2004) (*Method B*)

Client:	Hull & Associates, Inc.	Boring No.:	B18-34
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	2
Lab ID:	2018-443-001-002	Description:	Brown Clay

(- # 10 Sieve material)

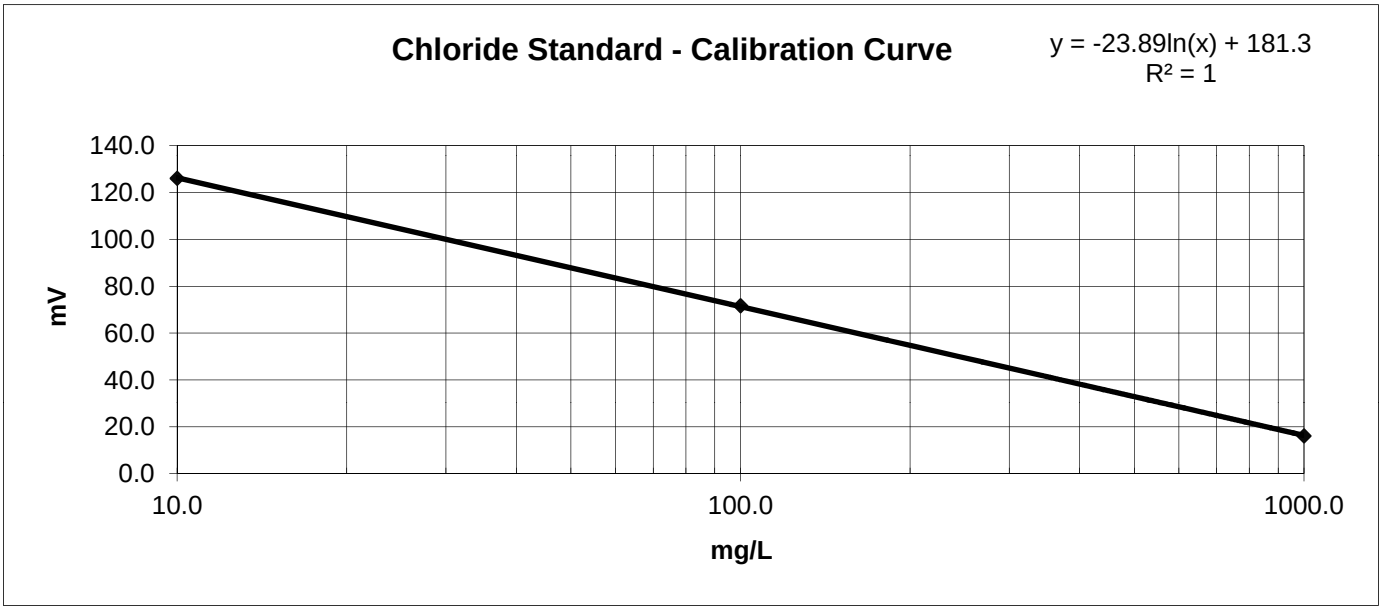
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	126.1
100.0	mg/L	71.7
1000.0	mg/L	16.1

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	107.7	21.79	21.79

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	7/24/18	Checked By	TMP	Date	7/25/18

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Hull & Associates, Inc.
Client Reference:	Hillcrest Solar Project / ORR010
Project No.:	2018-443-001

Lab ID:	002
Boring No.:	B18-34
Depth (ft):	NA
Sample No.:	2
Drying Tare No.:	35
Testing Tare No.:	K
Temperature (^{o}C):	21.8
pH of Sample:	**4.56**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	6.99	
10.00	9.99	

Tested By JAM Date 7/20/18 Checked By TMP Date 7/23/18

DCN: CT-S36B DATE 6/5/14 REVISION: 1

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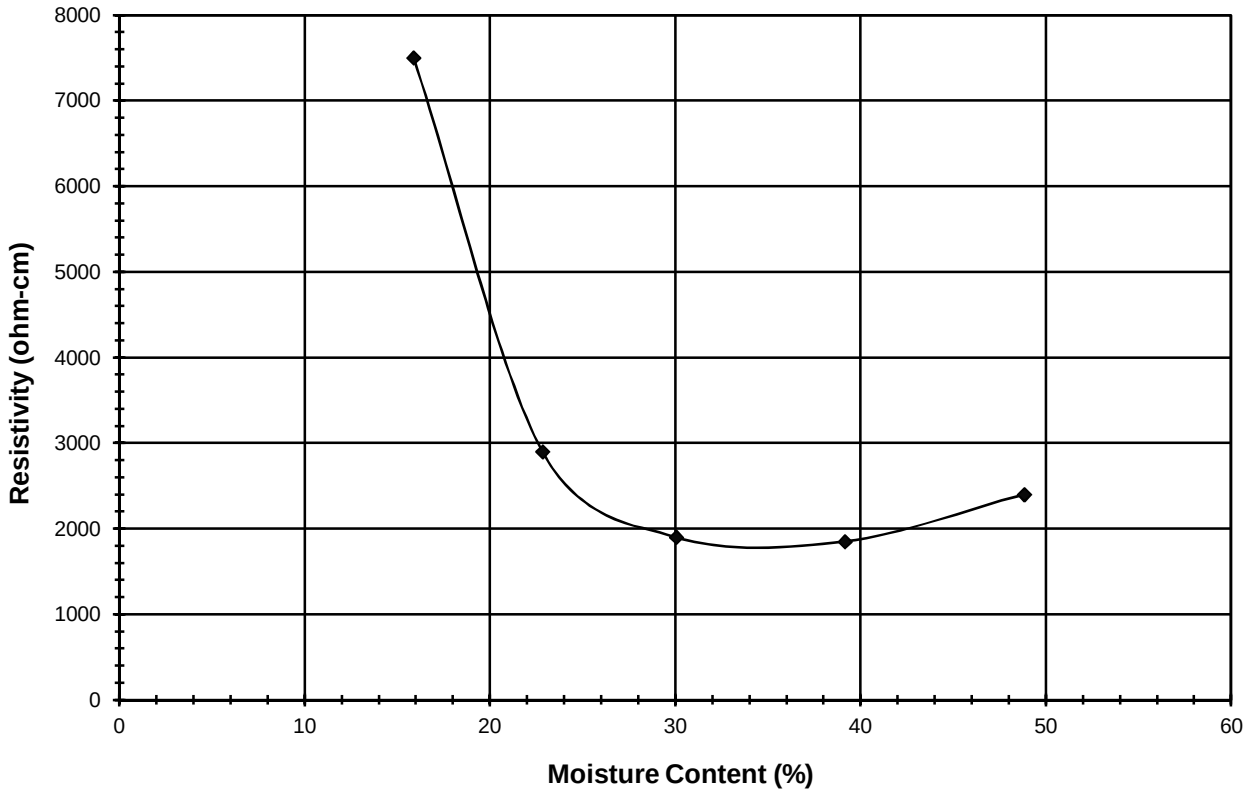
Minimum Resistivity

AASHTO T288-12

Client:	Hull & Associates, Inc.	Boring No.:	B18-34
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	2
Lab ID:	2018-443-001-002	Visual Description:	Brown Clay
		(- #10 Sieve material)	

Tare No.:	394	279	262	271	259
Tare & Wet Specimen (g):	38.66	50.93	50.52	51.14	60.64
Tare & Dry Specimen (g):	35.29	45.51	41.34	42.70	47.47
Tare Weight (g):	14.06	21.77	10.79	21.14	20.50
Moisture Content (%):	**15.9**	**22.8**	**30.0**	**39.1**	**48.8**
Resistance (ohm):	**7500**	**2900**	**1900**	**1850**	**2400**
Resistivity (ohm-cm):	**7500**	**2900**	**1900**	**1850**	**2400**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 7/20/18 *Checked By* TMP *Date* 7/23/18

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2012)

Client:	Hull & Associates, Inc.	Boring No.:	B18-34
Client Reference:	Hillcrest Solar Project / ORR010	Depth (ft):	NA
Project No.:	2018-443-001	Sample No.:	2
Lab ID:	2018-443-001-002	Soil Description:	Brown Clay

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	17	50	88	138	235	362	451

Measurement of Barium Chloride Turbidity

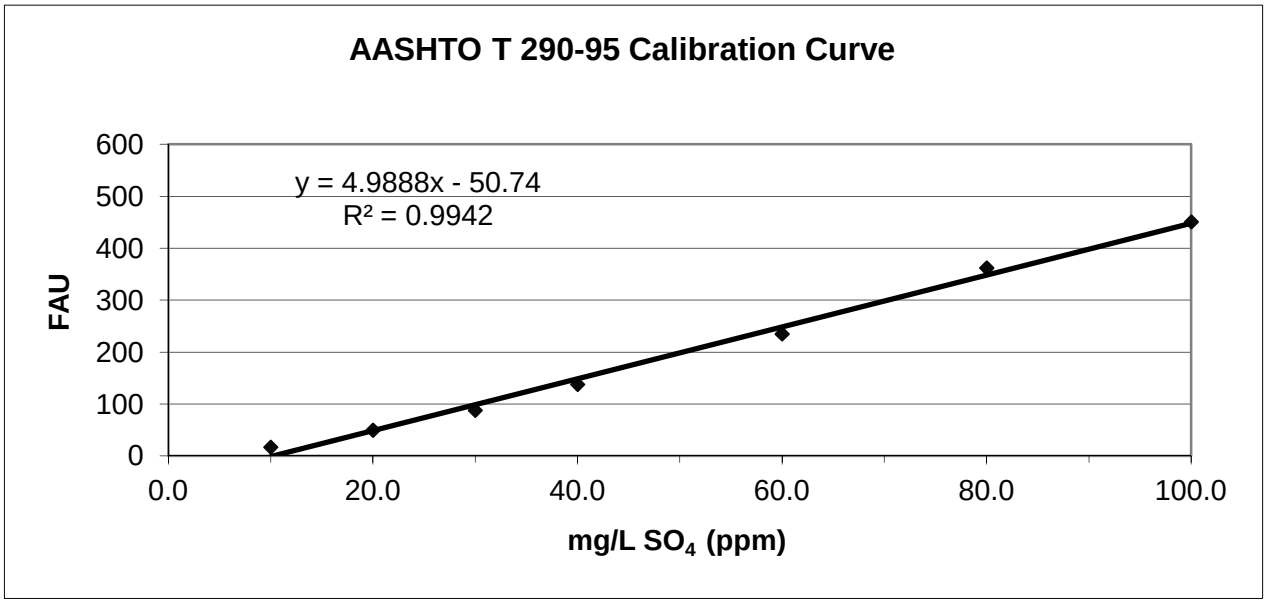
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	74
NaCl Solution Mix Date:	4/4/18

Sample Moisture Content

Tare Number:	886
Weight of Tare & Wet Sample (g):	213.05
Weight of Tare & Dry Sample (g):	207.73
Weight of Tare (g):	109.49
Weight of Water (g):	5.32
Weight of Dry Sample (g):	98.24
Moisture Content (%):	5.42

Sample Sulfate Ion Concentration:	25.00	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	75.0	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	79.3	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 7/23/18 Checked by: TMP Date: 7/24/18

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

TestAmerica Job ID: 180-80102-1
Client Project/Site: Geotechnics, Hull & Associates, Inc.

For:
Geotechnics Inc.
544 Braddock Ave
East Pittsburgh, Pennsylvania 15112

Attn: Nate Melaro

Authorized for release by:
8/1/2018 4:52:10 PM

David Dunlap, Senior Project Manager
(412)963-2432
david.dunlap@testamericainc.com

Table of Contents

Case Narrative

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Job ID: 180-80102-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative
180-80102-1

Receipt
The sample was received on 7/24/2018 3:45 PM; the sample arrived in good condition. The temperature of the cooler at receipt was 24.4º C. The sample was not received on ice.

The sample collection date was not listed on the chain of custody or sample containers. The relinquished date (7/24/18) was used as the collection date.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geotechnics Inc. TestAmerica Job ID: 180-80102-1
Project/Site: Geotechnics, Hull & Associates, Inc.

Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Pennsylvania	NELAP	3	02-00416	04-30-19

Analysis Method	Prep Method	Matrix	Analyte

Sample Summary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-80102-1	B18-34	Solid	07/24/18 00:00	07/24/18 15:45

Method Summary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Method	Method Description	Protocol	Laboratory
2540G	SM 2540G	SM22	TAL PIT
EPA 9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL PIT
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	TAL PIT

Protocol References:

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Client Sample ID: B18-34
Date Collected: 07/24/18 00:00
Date Received: 07/24/18 15:45

Lab Sample ID: 180-80102-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			252265	07/31/18 09:49	AVS	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: B18-34
Date Collected: 07/24/18 00:00
Date Received: 07/24/18 15:45

Lab Sample ID: 180-80102-1
Matrix: Solid
Percent Solids: 94.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			4.98 g	50 mL	252238	07/31/18 08:55	SES	TAL PIT
Total/NA	Analysis	EPA 9034		1			252256	07/31/18 10:44	SES	TAL PIT
	Instrument ID: NOEQUIP									

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

SES = Samantha Strauser

Batch Type: Analysis

AVS = Abbey Smith

SES = Samantha Strauser

Client Sample Results

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

Client Sample ID: B18-34 — **Lab Sample ID: 180-80102-1**
Date Collected: 07/24/18 00:00 — **Matrix: Solid**
Date Received: 07/24/18 15:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.6		0.1	0.1	%			07/31/18 09:49	1
Percent Solids	94.4		0.1	0.1	%			07/31/18 09:49	1

Client Sample ID: B18-34 — **Lab Sample ID: 180-80102-1**
Date Collected: 07/24/18 00:00 — **Matrix: Solid**
Date Received: 07/24/18 15:45 — **Percent Solids: 94.4**

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	16	J	32	11	mg/Kg	☼	07/31/18 08:55	07/31/18 10:44	1

Method: 2540G - SM 2540G

Lab Sample ID: 180-80102-1 DU
Matrix: Solid
Analysis Batch: 252265

Client Sample ID: B18-34
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	5.6			5.6		%				1	20
Percent Solids	94.4			94.4		%				0.06	20

Method: EPA 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 180-252238/1-A
Matrix: Solid
Analysis Batch: 252256

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252238

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		30	10	mg/Kg		07/31/18 08:55	07/31/18 10:39	1

Lab Sample ID: LCS 180-252238/2-A
Matrix: Solid
Analysis Batch: 252256

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 252238

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			123	123		mg/Kg		100	85 - 115		

Lab Sample ID: 180-80102-1 MS
Matrix: Solid
Analysis Batch: 252256

Client Sample ID: B18-34
Prep Type: Total/NA
Prep Batch: 252238

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide	16	J	131	126		mg/Kg	☼	84	75 - 125		

Lab Sample ID: 180-80102-1 MSD
Matrix: Solid
Analysis Batch: 252256

Client Sample ID: B18-34
Prep Type: Total/NA
Prep Batch: 252238

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	16	J	131	125		mg/Kg	☼	83	75 - 125	1	20

QC Association Summary

Client: Geotechnics Inc.
Project/Site: Geotechnics, Hull & Associates, Inc.

TestAmerica Job ID: 180-80102-1

General Chemistry

Prep Batch: 252238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-80102-1	B18-34	Total/NA	Solid	9030B	
MB 180-252238/1-A	Method Blank	Total/NA	Solid	9030B	
LCS 180-252238/2-A	Lab Control Sample	Total/NA	Solid	9030B	
180-80102-1 MS	B18-34	Total/NA	Solid	9030B	
180-80102-1 MSD	B18-34	Total/NA	Solid	9030B	

Analysis Batch: 252256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-80102-1	B18-34	Total/NA	Solid	EPA 9034	252238
MB 180-252238/1-A	Method Blank	Total/NA	Solid	EPA 9034	252238
LCS 180-252238/2-A	Lab Control Sample	Total/NA	Solid	EPA 9034	252238
180-80102-1 MS	B18-34	Total/NA	Solid	EPA 9034	252238
180-80102-1 MSD	B18-34	Total/NA	Solid	EPA 9034	252238

Analysis Batch: 252265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-80102-1	B18-34	Total/NA	Solid	2540G	
180-80102-1 DU	B18-34	Total/NA	Solid	2540G	

Login Sample Receipt Checklist

Client: Geotechnics Inc.

Job Number: 180-80102-1

Login Number: 80102
List Number: 1
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	used shipment date of 7/24 as collection date
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX C

ELECTRICAL EARTH RESISTIVITY TESTING

MAIN OFFICE
720 Greencrest Drive
Westerville, OH 43081
614.895.1400 **phone**
614.895.1171 **fax**

YOUNGSTOWN OFFICE
8433 South Avenue
Building 1, Suite 1
Boardman, OH 44514
330.965.1400 **phone**
330.965.1410 **fax**

DAYTON OFFICE
2380 Bellbrook Avenue
Xenia, OH 45385
937.736.2053 **phone**

GEOTECHNICAL
CONSULTANTS INC.

www.gci2000.com

June 19, 2018

Mr. Shawn D. McGee
Hull & Associates, Inc.
4 Hemisphere Way
Bedford, Ohio 44146

Reference: Field Earth Resistivity Test - Hillcrest Solar Project
Greenbush East Road
Green Township, Brown County, Ohio
GCI Project No. 18-G-21743

Dear Mr. McGee:

Geotechnical Consultants, Inc. (GCI) completed the requested field electrical resistivity testing for the Hillcrest Solar Project at the referenced site on June 18, 2018. We used a Vibroground Earth Resistivity tester (Model #293A) to complete the electrical resistivity testing following the Wenner four-pin soil resistivity test set-up. We performed the survey along two lines as shown in the attached plan. GCI completed the electrical resistivity tests in accordance with the requirements of AEP Standard SS-316000 "Substation Ground Testing, 6.0 'A' Four Terminal Test.".

The electrical resistivity test measurements are summarized in the attached plot and listed in the attached table. Due to the high temperatures, it was not possible to complete the survey along the north-south line as the unit was overheated.

As shown in the attached photographs, the area was covered with crops.

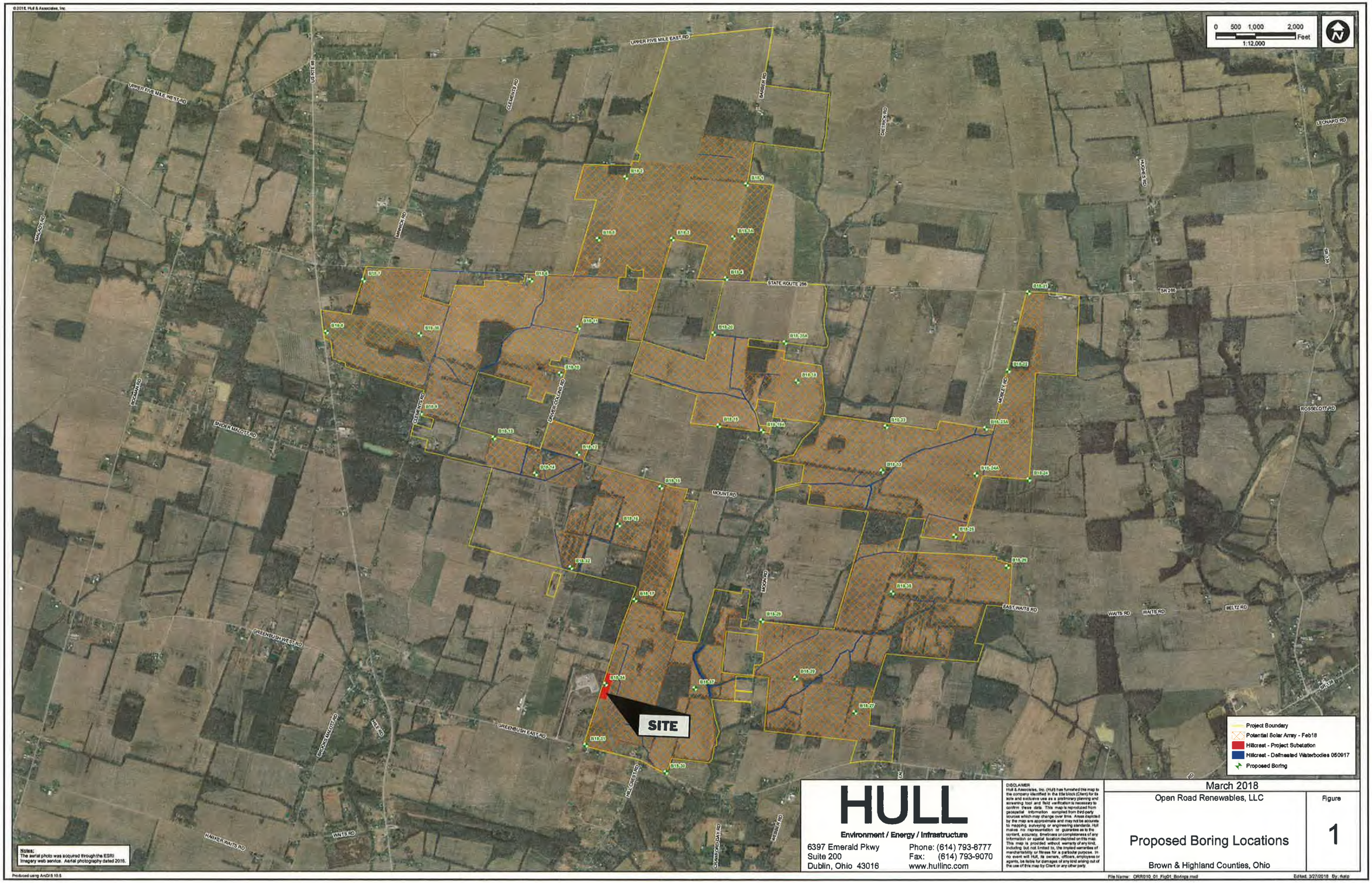
The range of resistivity values is consistent with the clay-based soils encountered in our borings. Based on the "Groundwater Resources of Brown County" published by ODNR, limestone and shale bedrock is at depths of 55 to 90 feet in this area which is consistent with the increase in resistivity at a probe spacing of 90 feet.

Respectfully submitted,
Geotechnical Consultants, Inc.

Kevin M. O'Connor, PE
Senior Project Manager

Distribution: Mr. Shaw McGee @ Hull – 1 pdf via email
GCI File – 1 copy

Attachments: Site Location
Plan of Field Test Lines
Plot of Resistivity Measurements
Table of Resistivity Measurements
Site Photographs (3)
Borings Logs (B-18-17, B-18-31, B-18-34)



HULL

Environment / Energy / Infrastructure

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Dublin, Ohio 43016

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Fax: (614) 793-9070
www.hullinc.com

March 2018

Open Road Renewables, LLC

Proposed Boring Locations

Brown & Highland Counties, Ohio

Figure 1

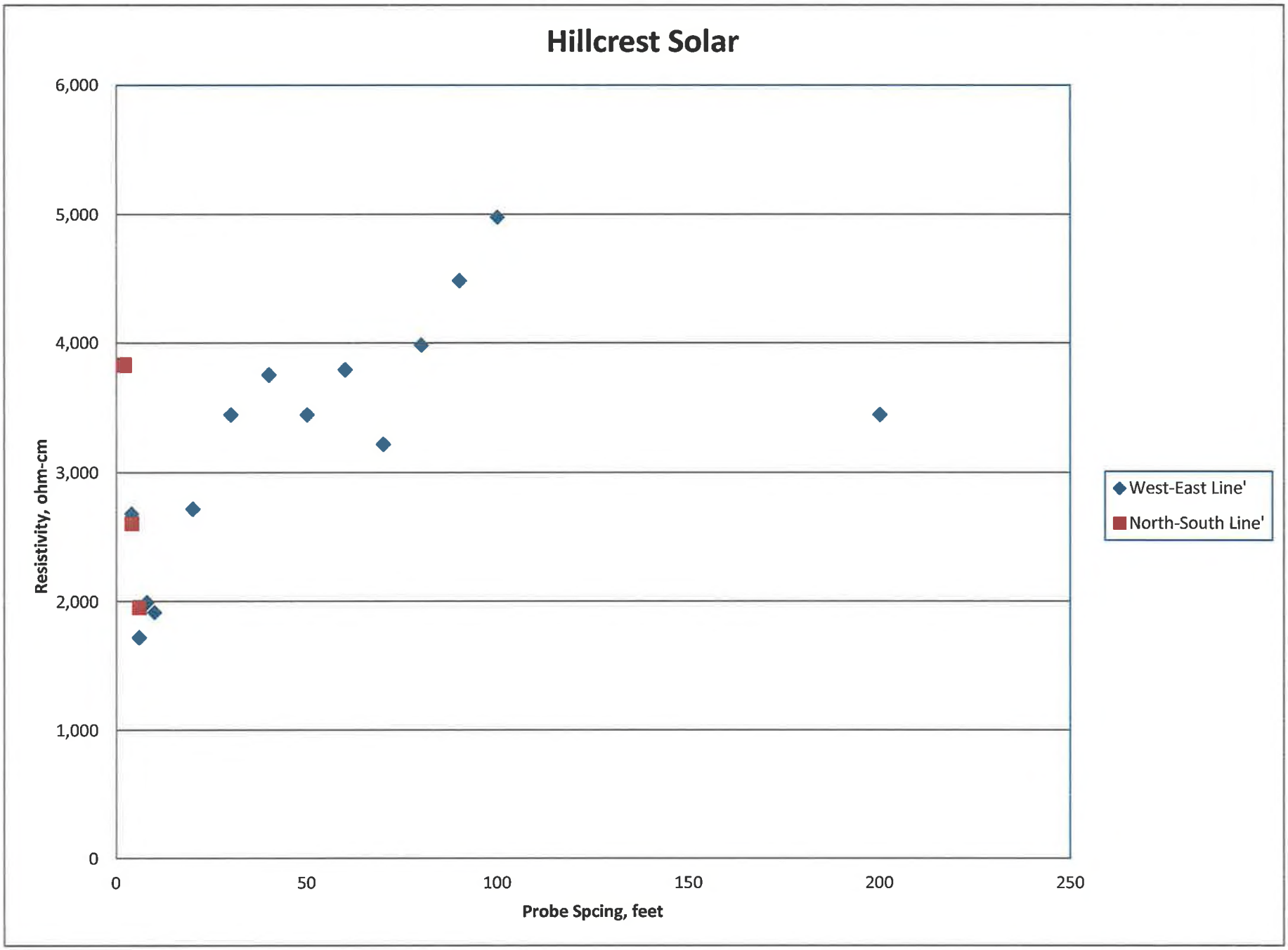
File Name: ORR010_01_Fig01_Borings.mxd

Edited: 3/27/2018 By: Aeltz

N
W E
S

Approximate Survey LineLocation

SURVEY LINE LOCATION PLAN	
Hillcrest Solar Project Green Township, Brown County - Ohio	
Base Map: Google Map	
Project No.: 18-G-21743	
Date: 6/19/18	Drawn By: koc
Scale: as shown	


Hillcrest Solar
6,000
5,000
4,000
3,000
2,000
1,000
0
Resistivity, ohm-cm
0
50
100
150
200
250
Probe Spcing, feet
West-East Line'
North-South Line'

Hillcrest Solar				18-Jun-18		Probe Depth 6 inches			
Greenbush East Road									
Green Township, Brown County				90 deg-F to 95 deg-F					
Project No. 18-G-21743				Sunny					
								P = 191.5 * a * R	
		"a"				"R"			
Line		Probe	Dial	Multipler		Reading		Resistivty	
		Spacing							
		(ft)						(ohm-cm)	
West -East		2	0.10	100.0		10.00		3,830	
		4	0.35	10.0		3.50		2,681	
		6	0.15	10.0		1.50		1,724	
		8	0.13	10.0		1.30		1,992	
		10	0.10	10.0		1.00		1,915	
		20	0.71	1.0		0.71		2,719	
		30	0.60	1.0		0.60		3,447	
		40	0.49	1.0		0.49		3,753	
		50	0.36	1.0		0.36		3,447	
		60	0.33	1.0		0.33		3,792	
		70	0.24	1.0		0.24		3,217	
		80	0.26	1.0		0.26		3,983	
		90	0.26	1.0		0.26		4,481	
		100	0.26	1.0		0.26		4,979	
		200	0.09	1.0		0.09		3,447	
North-South		2	0.10	100.0		10.00		3,830	
		4	0.34	10.0		3.40		2,604	
		6	0.17	10.0		1.70		1,953	
		8	NR - unit overeating						
		10	NR - unit overeating						
		20	NR - unit overeating						
		30	NR - unit overeating						
		40	NR - unit overeating						
		50	NR - unit overeating						
		60	NR - unit overeating						
		70	NR - unit overeating						
		80	NR - unit overeating						
		90	NR - unit overeating						
		100	NR - unit overeating						
		200	NR - unit overeating						

Photo 1: Looking west along West-East Line, (Duke Hillcrest substation in background)

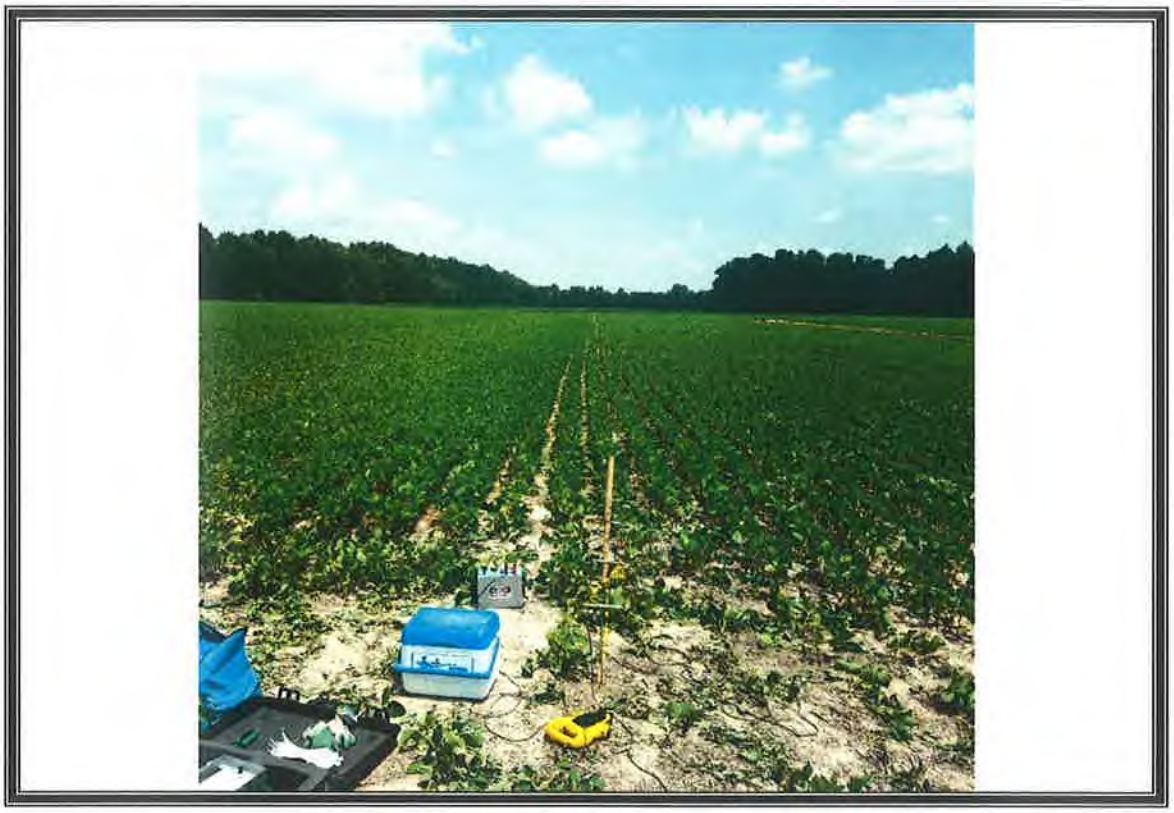


Photo 2: Looking north along North-South line

Photo 3: Looking south along North South line

Photo 4: [Photo Description]

TEST BORING LOG

PROJECT NAME **Hillcrest Solar Project - Green Township, Brown County, Ohio** BORING NO. **B-18-17**

PROJ. SURF. ELEV. ±

CLIENT **Hull & Associates** NO. **18-G-21743** DATE DRILLED **4/19/2018**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
		0.0-1.5	SS	1	2	2	Moist	0.2	Topsoil
									Brown Lean Clay
		2.0-3.5	SS	2	2	2	Very Moist		
		4.0-5.5	SS	2	2	3	Moist		
5									
		8.5-10.0	SS	6	9	13	Moist	9.0	Brown Lean Clay with Sand (CL) - glacial till
10									
		13.5-15.0	SS	7	11	15	Moist	14.5	
15								15.0	Gray Sandy Lean Clay with Gravel (CL) - glacial till
									BOTTOM OF BORING: 15'

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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TEST BORING LOG

PROJECT NAME **Hillcrest Solar Project - Green Township, Brown County, Ohio** BORING NO. **B-18-31**

PROJ. SURF. ELEV. ±

CLIENT **Hull & Associates** NO. **18-G-21743** DATE DRILLED **4/12/2018**

GROUND WATER OBSERVATION

10.0 FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
		0.0-1.5	SS	3	6	5	Moist	0.4	Topsoil
									Brown Lean Clay
		2.0-3.5	SS	3	3	5	Moist		
		4.0-5.5	SS	4	4	6	Moist		
5									
								8.0	Water Seepage at 8'
		8.5-9.3	SS	18	30/3		Moist		Brown Lean Clay with Sand (CL) - glacial till
10									
		13.5-15.0	SS	21	29	38	Moist		
15								15.0	
									BOTTOM OF BORING: 15'

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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TEST BORING LOG

PROJECT NAME **Hillcrest Solar Project - Green Township, Brown County, Ohio** BORING NO. **B-18-34**

PROJ. SURF. ELEV. ±

CLIENT **Hull & Associates** NO. **18-G-21743** DATE DRILLED **4/19/2018**

GROUND WATER OBSERVATION

5.0 FEET BELOW SURFACE AT COMPLETION

____ FEET BELOW SURFACE AT 24 HOURS

____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0 - 10	Loose	0 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
50 +	Very Dense	15 - 30	Very Stiff
		30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
		0.0-1.5	SS	2	2	3	Moist	0.3	Topsoil
									Brown Lean Clay
		2.0-3.5	SS	2	2	3	Moist		
		4.0-5.5	SS	2	3	3	Moist		
5								6.5	
									Brown Lean Clay with Sand (CL) - glacial till, limestone fragments, sand and gravel layers
		8.5-10.0	SS	11	15	20	Moist		
10									
									Water Seepage at 12'
		13.5-15.0	SS	5	6	8	Very Moist	14.0	
15									Gray Sandy Lean Clay with Gravel (CL) - glacial till, sand and gravel layers
		18.5-20.0	SS	8	15	22	Wet		
20									
									BOTTOM OF BORING: 25'
		23.5-25.0	SS	21	25	33	Moist		
								25.0	

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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